Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

Insitu fabrication of ZIF-67 on titania coated magnetic nanoparticles: A new platform for the immobilization of Pd(II) with enhanced catalytic activity in organic transformations

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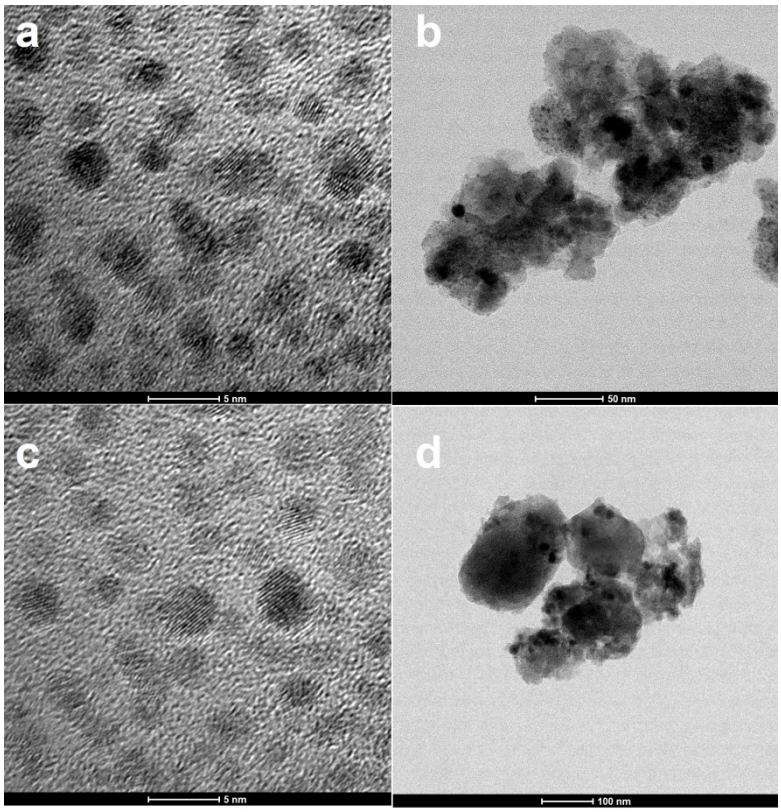
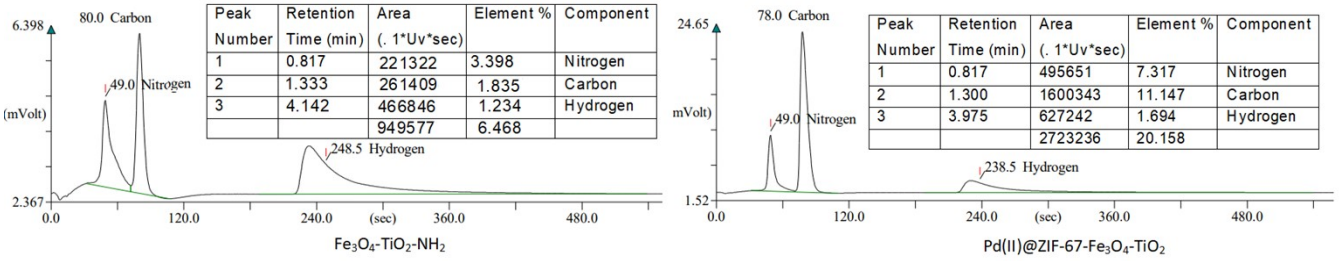


Fig. S1 HR-TEM micrographs of Pd@ZIF-67-Fe_3O_4-TiO_2.



Peak Number	Retention Time (min)	Area (. 1*Uv*sec)	Element %	Component
1	0.817	221322	3.398	Nitrogen
2	1.333	261409	1.835	Carbon
3	4.142	466846	1.234	Hydrogen
		949577	6.468	

Peak Number	Retention Time (min)	Area (. 1*Uv*sec)	Element %	Component
1	0.817	495651	7.317	Nitrogen
2	1.300	1600343	11.147	Carbon
3	3.975	627242	1.694	Hydrogen
		2723236	20.158	

Fig. S2 CHN analysis of Fe_3O_4-TiO_2-NH_2 and Pd@ZIF-67-Fe_3O_4-TiO_2.

Table S1. Effect of different solvents and temperature on Pd@ZIF-67-Fe_3O_4-TiO_2 catalyzed reduction of nitroarenes and α,β-unsaturated carbonyl compounds[a,b,c]

Entry	Solvent	Temperature (°C)	Nitroarenes		α,β-unsaturated carbonyl compounds	
			Time (h)	Yield[c] (%)	Time (h)	Yield[c] (%)
1	H_2O	RT	3	45	4	40
2	H_2O	60	3	65	4	45
3	H_2O	80	1	95	4	50
4	H_2O	100	1	96	4	60
5	CH_3CN	80	3	80	3	70
6	CH_3CN: H_2O (1:1)	80	3	82	3	68
7	EtOH	80	3	50	1.5	90
8	EtOH: H_2O (1:3)	80	3	55	1.5	95
9	EtOH: H_2O (1:3)	100	2	60	1.5	96
10	Toluene	100	3	70	3	60

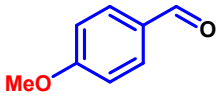
Reaction conditions: [a]4-nitroaniline (1 mmol), Pd@ZIF-67-Fe_3O_4-TiO_2(0.1 g, 7.5 mol% Pd), solvent (8 mL) under H_2 atmosphere at 80 °C. [b]1-(4-methoxyphenyl)-3-phenylprop-2-ene-1-one (1 mmol), Pd@ZIF-67-Fe_3O_4-TiO_2 (0.1 g, 7.5 mol% Pd), solvent (8 mL) under H_2 atmosphere at 80 °C. [c]Column chromatography yield.

Table S2 Recyclability of Pd@ZIF-67-Fe_3O_4-TiO_2 for oxidation, reduction and oxidative deprotection of oximes

	Oxidation[a]		Reduction[b]		Oxidative deprotection of oximes[c]	
Catalytic runs	Catalyst amount (g)	Yield[d] (%)	Catalyst amount (g)	Yield[d] (%)	Catalyst amount (g)	Yield[e] (%)
1	0.1	88	0.1	95	0.1	92
2	0.095	86	0.092	94	0.094	91
3	0.091	85	0.089	92	0.091	89
4	0.088	82	0.085	89	0.087	87
5	0.085	81	0.080	88	0.082	84

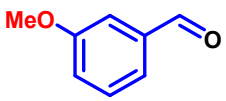
[a]Reaction conditions: 4-methoxybenzyl alcohol (1 mmol), TBHP (1 mmol), Pd@ZIF-67-Fe_3O_4-TiO_2 (0.1 g, 7.5 mol% Pd) in EtOH (8 mL) at 80 °C. [b]Reaction conditions: 4-nitroaniline (1 mmol), Pd@ZIF-67-Fe_3O_4-TiO_2 (0.1 g, 7.5 mol % Pd) in H_2O (8 mL) under H_2 atmosphere at 80 °C. [c]Reaction conditions: 4-bromobenzaldehyde oxime (1 mmol), TEMPO (0.03 g, 0.2 mmol) and Pd@ZIF-67-Fe_3O_4-TiO_2 (0.1 g, 7.5 mol % Pd) in toluene (5 mL) at 60 °C. [d]Column chromatographic yield. [e]Isolated yields.

S1. Spectral details of compounds listed in Table 4



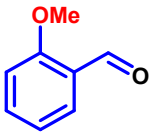
4-Methoxybenzaldehyde (2a)

^{1}H NMR (400 MHz, $CDCl_3$): δ 9.71 (s, 1H, CHO), 7.66 (d, *J*= 8.7 Hz, 2H, ArH), 6.83 (d, *J*= 8.6 Hz, 2H, ArH), 3.69 (s, 3H, OCH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 190.71, 164.50, 131.93, 129.62, 114.20, 55.23.



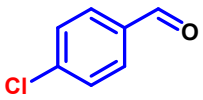
3-Methoxybenzaldehyde (2b)

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.97 (s, 1H, CHO), 7.45 (d, *J* = 6.3 Hz, 2H, ArH), 7.39 (s, 1H, ArH), 7.18 – 7.17 (m, 1H, ArH), 3.86 (s, 3H, OCH_3); ^{13}C NMR (101 MHz, $CDCl_3$): δ 192.07, 160.12, 137.86, 129.93, 123.70, 121.55, 111.69, 54.98.



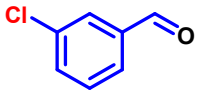
2-Methoxybenzaldehyde (2c)

^{1}H NMR (400 MHz, $CDCl_3$): δ 10.50 (s, 1H, CHO), 7.86 (d, *J* = 7.7 Hz, 1H, Ar-H), 7.58 (t, *J* = 7.9 Hz, 1H, Ar-H), 7.01-7.08 (m, 2H, Ar-H), 3.96 (s, 3H, OCH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 189.90, 161.81, 135.91, 128.55, 124.49, 120.69, 111.68, 55.74.



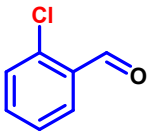
4-Chlorobenzaldehyde (2d)

^{1}H NMR (400 MHz, $CDCl_3$): δ 10.00 (s, 1H, CHO), 7.84 (d, *J* = 8.3 Hz, 2H, Ar-H), 7.53 (d, *J* = 8.3 Hz, 2H, Ar-H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 191.05, 140.96, 134.58, 130.60, 129.31.



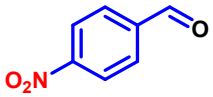
3-Chlorobenzaldehyde (2e)

^{1}H NMR (400 MHz, $CDCl_3$): δ 9.94 (s, 1H, CHO), 7.77 (s, 1H, Ar-H), 7.71 (d, *J* = 7.5 Hz, 1H, Ar-H), 7.53 (d, *J* = 8.0 Hz, 1H, Ar-H), 7.42 (t, *J* = 7.8 Hz, 1H, Ar-H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 190.81, 137.96, 135.33, 134.30, 130.36, 129.12,127.98.



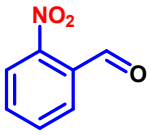
2-Chlorobenzaldehyde (2f)

^{1}H NMR (400 MHz, $CDCl_3$): δ 10.34 (s, 1H, CHO), 7.79 (d, *J* = 7.6, 1H, Ar-H), 7.44-7.27 (m, 3H, ArH); ^{13}C NMR (100 MHz, $CDCl_3$): δ 189.69, 137.78, 135.15, 132.28, 130.53, 129.26, 127.25.



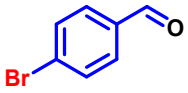
4-Nitrobenzaldehyde (2g)

^{1}H NMR (400 MHz, $CDCl_3$): δ 10.19 (s, 1H, CHO), 8.43 (d, *J* = 8.5 Hz, 2H, Ar-H), 8.11 (d, *J* = 8.5 Hz, 2H, Ar-H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 190.63, 151.87, 140.16, 130.63, 124.55.



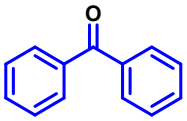
2-Nitrobenzaldehyde (2h)

^{1}H NMR (400 MHz, $CDCl_3$): *δ* 10.42 (s, 1H, CHO), 8.13 (d, *J* = 8 Hz, 1H, Ar-H), 7.96 (d, *J* = 8 Hz, 1H, Ar-H), 7.76-7.84 (m, 2H, Ar-H); ^{13}C NMR (100 MHz, $CDCl_3$): *δ* 188.24, 149.48, 133.92, 133.56, 131.22, 129.27, 124.32.



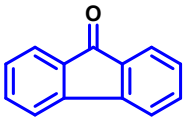
4-Bromobenzaldehyde (2i)

^{1}H NMR (400 MHz, $CDCl_3$): δ 10.00 (s, 1H, CHO), 7.78 (d, *J* = 7.8 Hz, 2H, Ar-H), 7.71 (d, *J* = 7.8 Hz, 2H, Ar-H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 197.49, 140.16, 137.54, 136.51, 133.91.



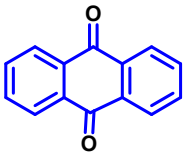
Benzophenone (2j)

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.84 (d, *J* = 8.1 Hz, 4H, Ar-H), 7.62 (t, *J* = 7.4 Hz, 2H, Ar-H), 7.51 (t, *J* = 7.6 Hz, 4H, Ar-H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 197.01, 137.61, 132.44, 129.99, 128.41.



Fluorenone (2k)

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (d, *J* = 7.3 Hz, 2H), 7.55-7.49 (m, 4H), 7.32 (t, *J* = 7.2 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 198.45, 144.52, 134.54, 133.94, 129.26, 124.36, 120.33.



Anthraquinone (2l)

1H NMR (400 MHz, CDCl3): δ 8.35 (dd, J = 5.8, 3.3 Hz, 4H, ArH), 7.84 (dd, J = 5.8, 3.3 Hz, 4H, ArH); 13C NMR (100 MHz , CDCl3): δ 184.26, 137.19, 136.97, 130.85.

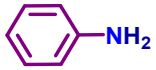
S2. Spectral details of the compounds listed in Table 5

1,4-diaminobenzene (4a)

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.60 (s, 4H, ArH), 3.23 (bs, 4H, NH_2); ^{13}C NMR (100 MHz, $CDCl_3$): δ 138.59, 116.74.

4-methylaniline (4b)

^{1}H NMR (400 MHz, DMSO): δ 6.82 (d, *J*= 8.1 Hz, 2H, ArH), 6.47 (d, *J*= 8.2 Hz, 2H, ArH), 4.78 (s, 2H, NH_2), 3.35 (s, 3H, CH_3); ^{13}C NMR (100 MHz, DMSO): δ 146.53, 129.69, 124.54, 114.76, 20.73.

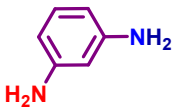


Aniline (4c)

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.31 (t, J = 6.9 Hz, 2H, ArH), 6.92 (t, J = 7.9 Hz, 1H, ArH), 6.79 (d, J = 8.4 Hz, 2H, ArH), 3.69 (s, 2H, NH_2); 13C NMR (100 MHz, CDCl3): δ 146.68, 129.47, 118.61, 115.29.

4-Bromoaniline (4d)

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.26 (d, 2H, *J* = 8.7 Hz, ArH), 6.59 (d, 2H, *J* = 8.7 Hz, ArH), 3.69 (s, 2H, NH_2); ^{13}C NMR (100 MHz, $CDCl_3$): δ 145.41, 132.02, 116.72, 110.22.

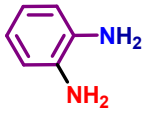


1,3-diaminobenzene (4e)

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.95 (t, *J*= 7.7 Hz, 1H, ArH), 6.18 (d, *J*= 8.5 Hz, 2H, ArH), 6.05 (s, 1H, ArH), 3.55 (bs, 4H, NH_2); ^{13}C NMR (100 MHz, $CDCl_3$): δ 149.19, 132.07, 106.79, 103.22.

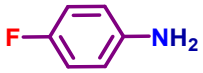
4-methoxyaniline (4f)

^{1}H NMR (400 MHz, CDCl3): δ 6.77 (d, J = 8 Hz, 2H, ArH), 6.67 (d, J = 8 Hz, 2H, ArH), 3.77 (s, 3H, COCH3), 3.44 (bs, 2H, NH2); 13C NMR (100 MHz, CDCl3): δ 152.82, 139.96, 116.43, 114.83, 55.75.



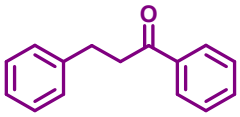
1,2-diaminobenzene (4g)

^{1}H NMR (400 MHz, DMSO): δ 6.52-6.48 (m, 2H, ArH), 6.40-6.36 (m, 2H, ArH), 4.38 (s, 4H, NH_2); ^{13}C NMR (100 MHz, DMSO): δ 135.39, 117.73, 114.98.



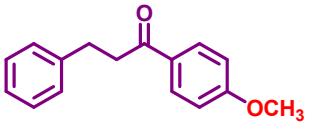
4-Fluoroaniline (4h)

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.89 (t, 2H, *J* = 8.6 Hz, ArH), 6.63 (dd, 2H, *J* = 8.6 Hz, 4.5 Hz, ArH), 3.60 (s, 2H, NH_2); ^{13}C NMR (100 MHz, $CDCl_3$): δ 156.38 (d, *J* = 235.2 Hz), 142.57 (d, *J* = 2.0 Hz), 116.10 (d, *J* = 7.6 Hz), 115.69 (d, *J* = 22.4 Hz).



1,3-diphenylpropan-1-one (6a)

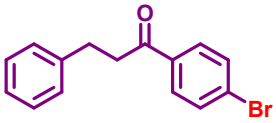
^{1}H NMR (400 MHz, $CDCl_3$): δ 7.99 (d, *J*= 7.4 Hz, 2H, ArH), 7.59 (t, *J*= 7.4 Hz, 1H, ArH), 7.48 (t, *J*= 7.6 Hz, 2H, ArH), 7.35-7.22 (m, 5H), 3.34 (t, *J*= 7.7 Hz, 2H, CH_2), 3.10 (t, *J*= 7.7 Hz, 2H, CH_2); ^{13}C NMR (100 MHz, $CDCl_3$): δ 199.50, 141.43, 136.84, 133.12, 128.64, 128.56, 128.45, 128.06, 126.16, 40.47, 29.94.



1-(4-methoxyphenyl)-3-phenylpropan-1-one (6b)

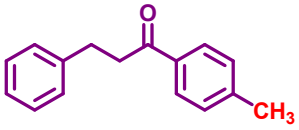
1H NMR (400 MHz, CDCl3): δ 7.97 (d, J = 8.8 Hz, 2H, ArH), 7.35 – 7.27 (m, 4H, ArH), 7.23 (t, J = 7.1 Hz, 1H, ArH), 6.95 (d, J = 8.8 Hz, 2H, ArH), 3.89 (s, 3H, OCH3), 3.28 (t, J = 7.7 Hz, 2H,

CH2), 3.08 (t, J = 7.7 Hz, 2H, CH2); 13C NMR (100 MHz, CDCl3): δ 197.85, 163.50, 141.48, 130.31, 130.01, 128.50, 128.42, 126.08, 113.74, 55.46, 40.11, 30.35



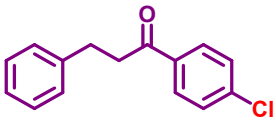
1-(4-bromophenyl)-3-phenylpropan-1-one (6c)

1H NMR (400 MHz, CDCl3): δ 7.99 (d, J = 7.1 Hz, 2H, ArH), 7.59 (t, J = 8.0 Hz, 1H, ArH), 7.48 (t, J = 7.6 Hz, 2H, ArH), 7.31 (d, J = 8.4 Hz, 2H, ArH), 7.23 (d, J = 8.5 Hz, 2H, ArH), 3.34 (t, J = 7.75 Hz, 2H, CH2), 3.10 (t, J = 7.7 Hz, 2H, CH2); 13C NMR (100 MHz, CDCl3): δ 199.21, 141.30, 136.86, 133.08, 128.62, 128.54, 128.44, 128.05, 126.15, 40.47, 30.14.



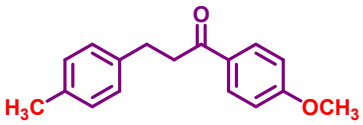
1-(4-methylphenyl)-3-phenylpropan-1-one (6d)

1H NMR (400 MHz, CDCl3): δ 7.90 (d, J = 7.9 Hz, 2H, ArH), 7.36 – 7.23 (m, 7H, ArH), 3.32 (t, J = 7.7 Hz, 2H, CH2), 3.10 (t, J = 7.6 Hz, 2H, CH2), 2.44 (s, 3H, ArCH3); 13C NMR (100 MHz, CDCl3): δ 198.98, 143.89, 141.47, 134.38, 129.32, 128.55, 128.47, 128.21, 126.14, 40.39, 30.23, 21.68.



1-(4-chlorophenyl)-3-phenylpropan-1-one (6e)

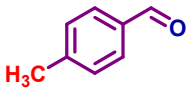
1H NMR (400 MHz, CDCl3): δ 7.98 (d, J = 7.1 Hz, 2H, ArH), 7.59 (t, J = 7.4 Hz, 1H, ArH), 7.48 (t, J = 7.6 Hz, 2H, ArH), 7.29 (d, J = 8.4 Hz, 2H, ArH), 7.21 (d, J = 8.5 Hz, 2H, ArH), 3.31 (t, J = 7.5 Hz, 2H, CH2), 3.07 (t, J = 7.5 Hz, 2H, CH2); 13C NMR (100 MHz, CDCl3): δ 198.84, 139.75, 136.79, 133.16, 131.89, 129.83, 128.65, 128.61, 128.02, 40.13, 29.39.



3-(4-methylphenyl)-1-(4'-methoxyphenyl)propan-1-one (6f)

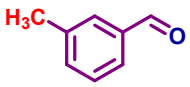
^{1}H NMR (400 MHz, $CDCl_3$): δ 7.96 (d, *J*= 8.7 Hz, 2H, ArH), 7.18-7.11 (m, 4H), 6.94 (d, *J*= 8.7 Hz, 2H, ArH), 3.92 (s, 3H), 3.25 (t, *J*= 7.8 Hz, 2H, CH_2), 3.03 (t, *J*= 7.7 Hz, 2H, CH_2), 2.34 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 197.93, 163.60, 138.36, 135.60, 130.33, 129.20, 128.31, 113.72, 55.69, 40.44, 29.91, 21.35.

S3. Spectral details of the compounds listed in Table 6



4-Methylbenzaldehyde (8f)

^{1}H NMR (400 MHz, $CDCl_3$): δ 9.97 (s, 1H, CHO), 7.78 (d, *J* = 7.7 Hz, 2H, ArH), 7.34 (d, *J* = 7.7 Hz, 2H, ArH), 2.44 (s, 3H, CH_3); ^{13}C NMR (101 MHz, $CDCl_3$): δ 192.10, 145.52, 134.16, 129.74, 129.05, 21.91.



3-Methylbenzaldehyde (8g)

^{1}H NMR (400 MHz, $CDCl_3$): δ 10.01 (s, 1H, CHO), 7.71-7. 69 (m, 2H, ArH), 7.48-7.42 (m, 2H, ArH), 2.46 (s, 3H, CH_3); ^{13}C NMR (101 MHz, $CDCl_3$): δ 192.70, 138.94, 136.46, 135.34, 130.05, 128.90, 127.27, 20.94.

S4. 1H NMR and 13C NMR spectra of compounds listed in Table 4

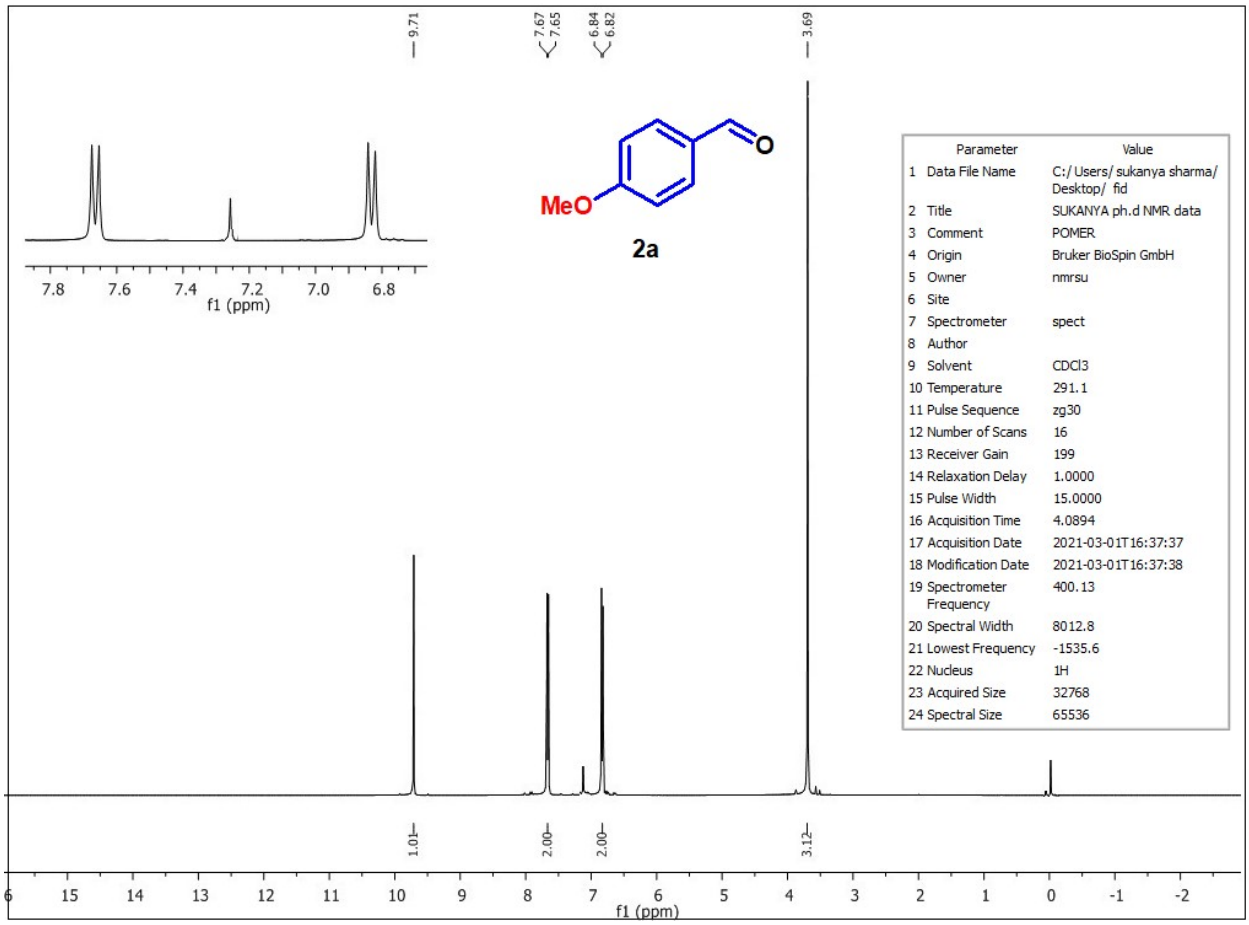


Figure 1. [1]H NMR spectra of 4-Methoxybenzaldehyde.

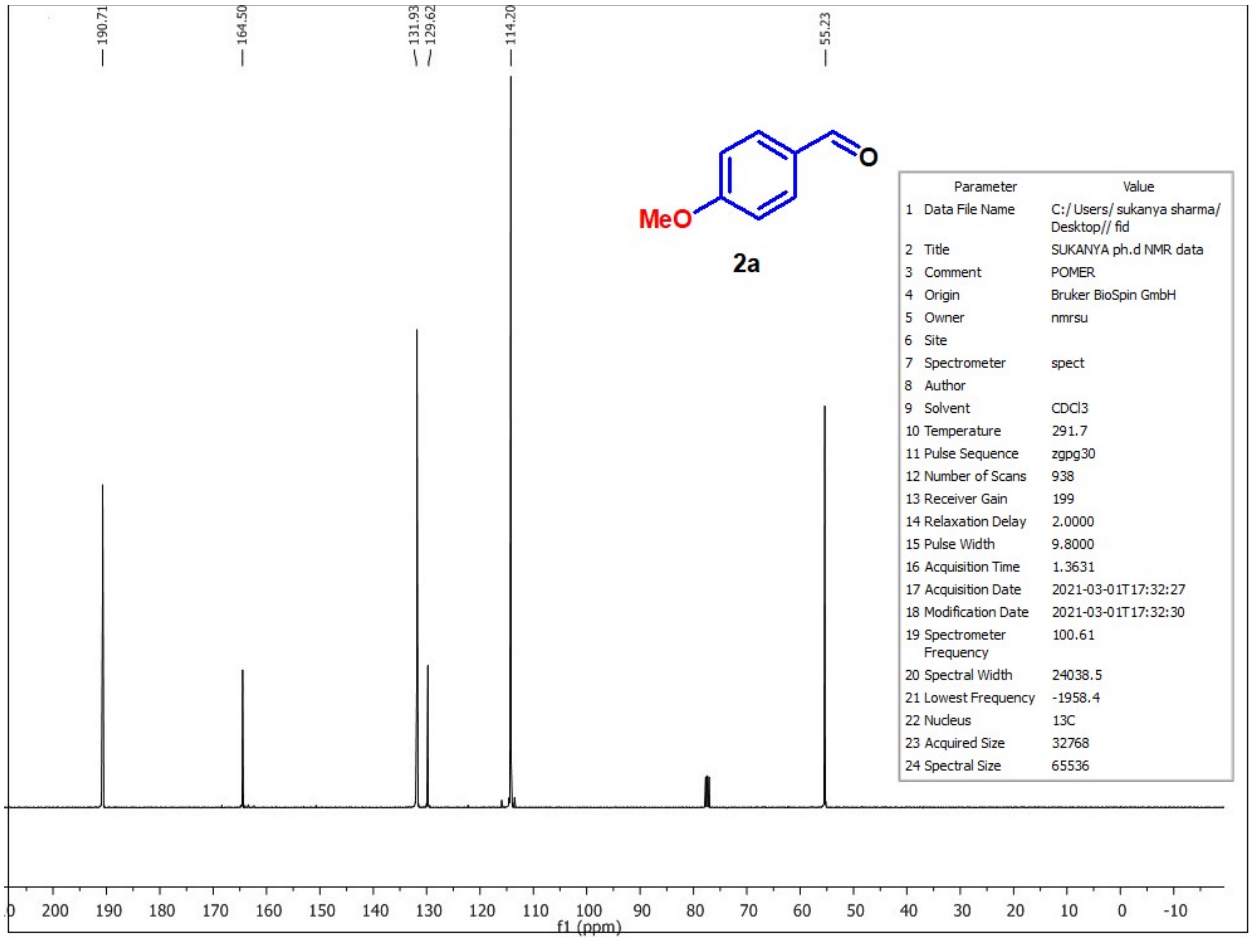


Figure 2. ^{13}C NMR spectra of 4-Methoxybenzaldehyde.

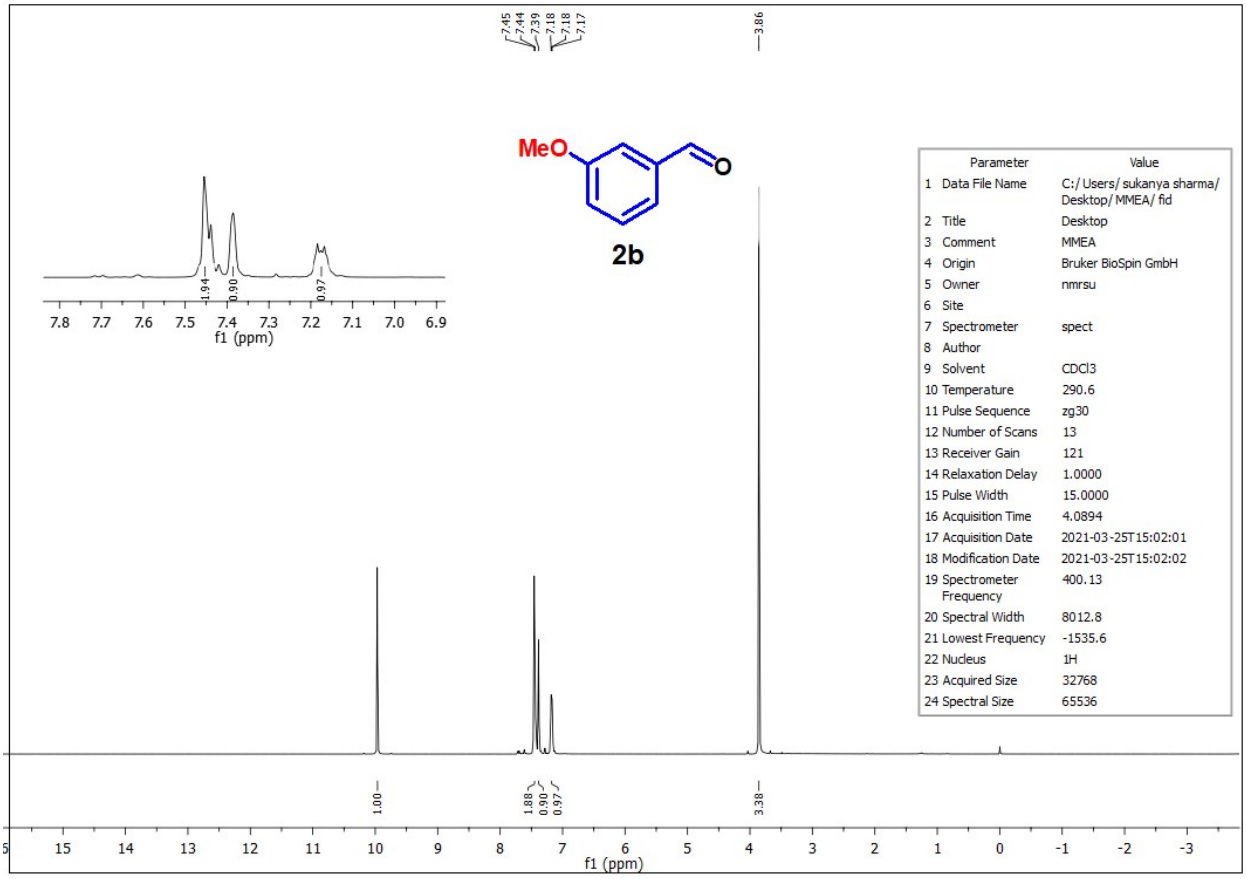


Figure 3. ^{1}H NMR spectra of 3-Methoxybenzaldehyde.

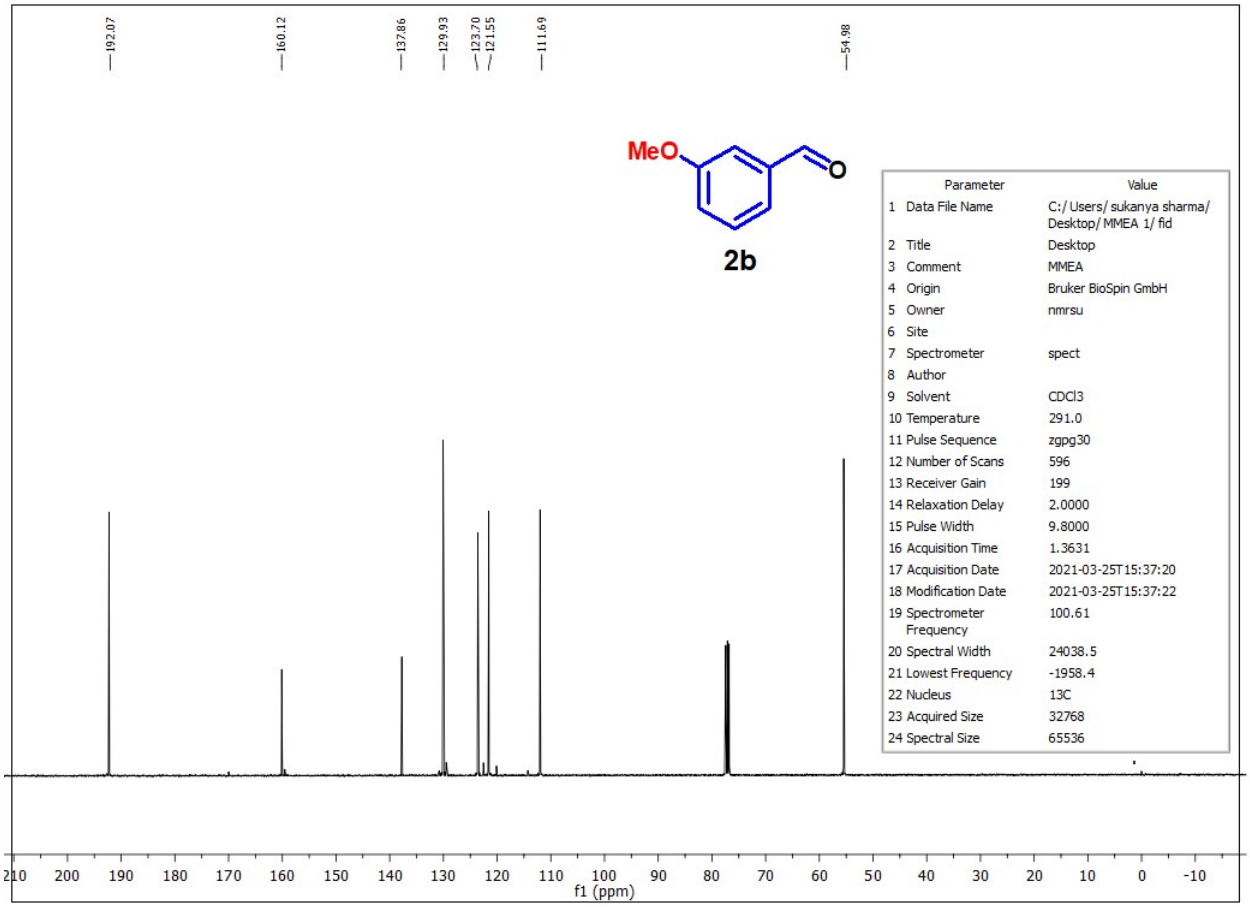


Figure 4. ^{13}C NMR spectra of 3-Methoxybenzaldehyde.

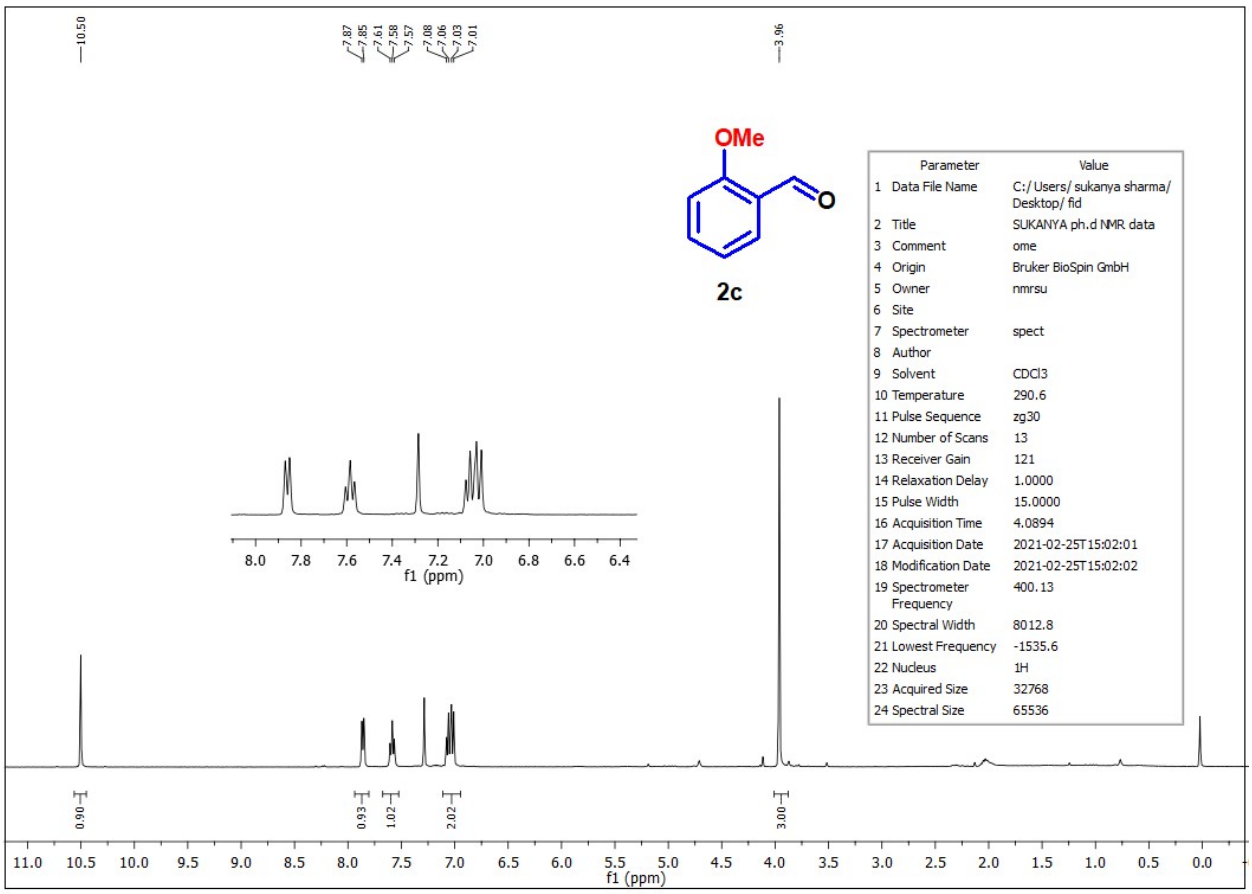


Figure 5. ^{1}H NMR spectra of 2-Methoxybenzaldehyde.

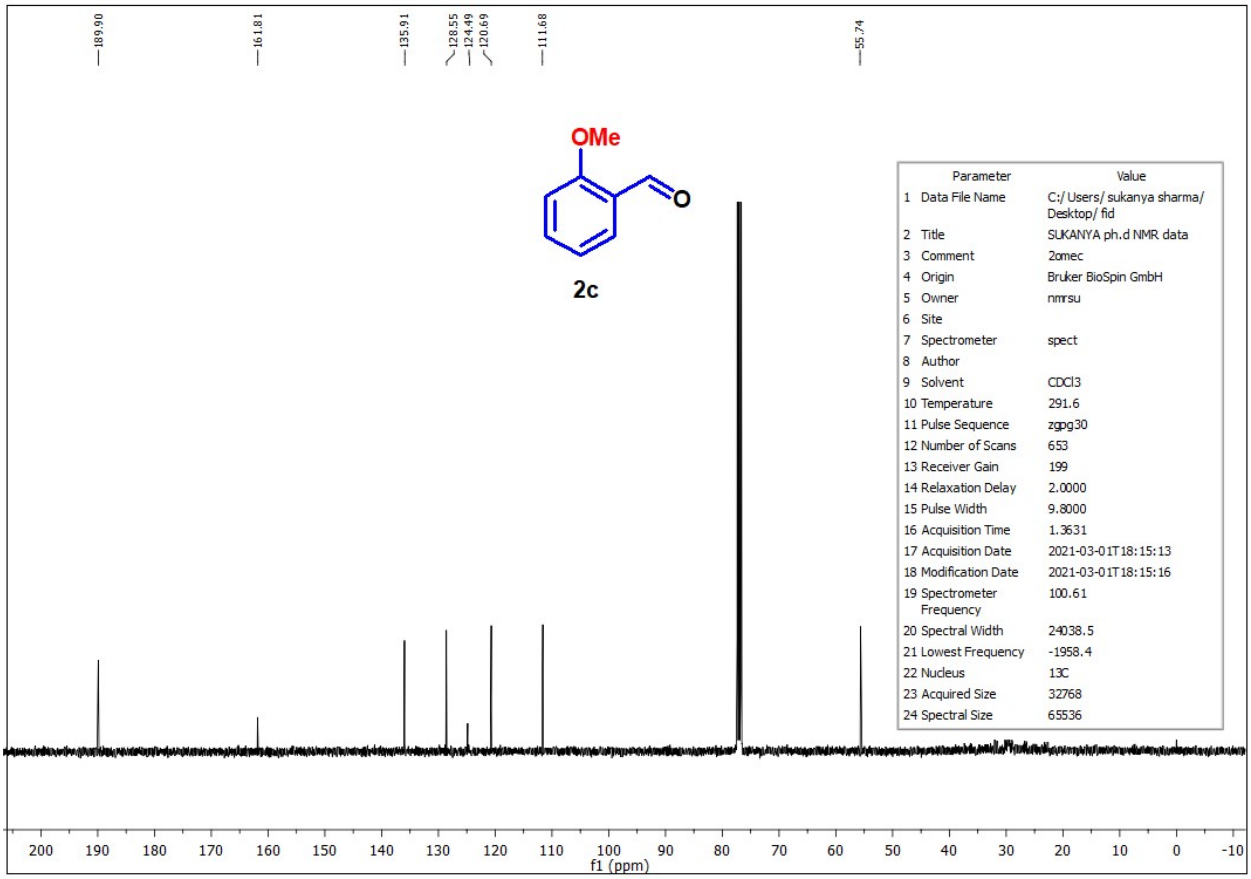


Figure 6. ^{13}C NMR spectra of 2-Methoxybenzaldehyde.

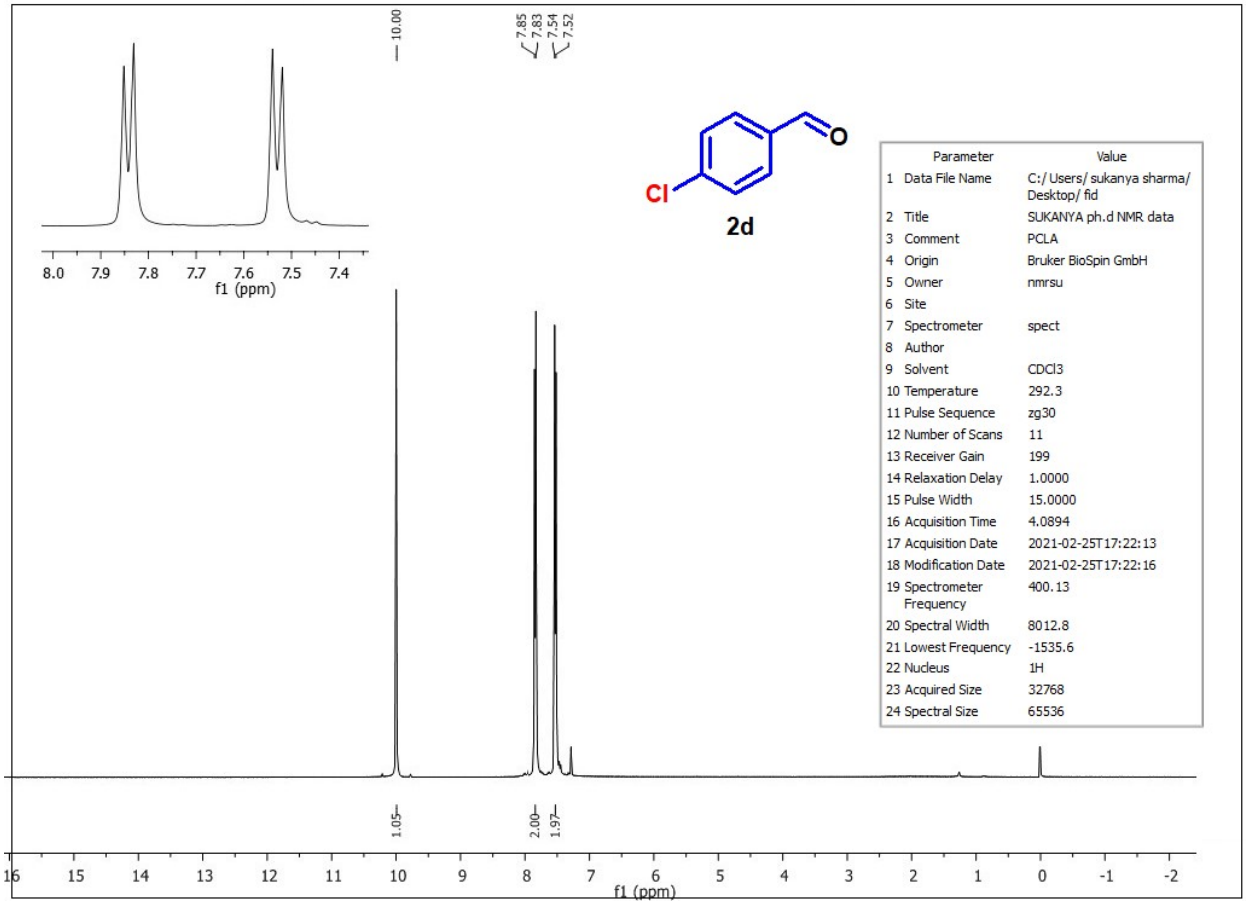


Figure 7. ^{1}H NMR spectra of 4-Chlorobenzaldehyde.

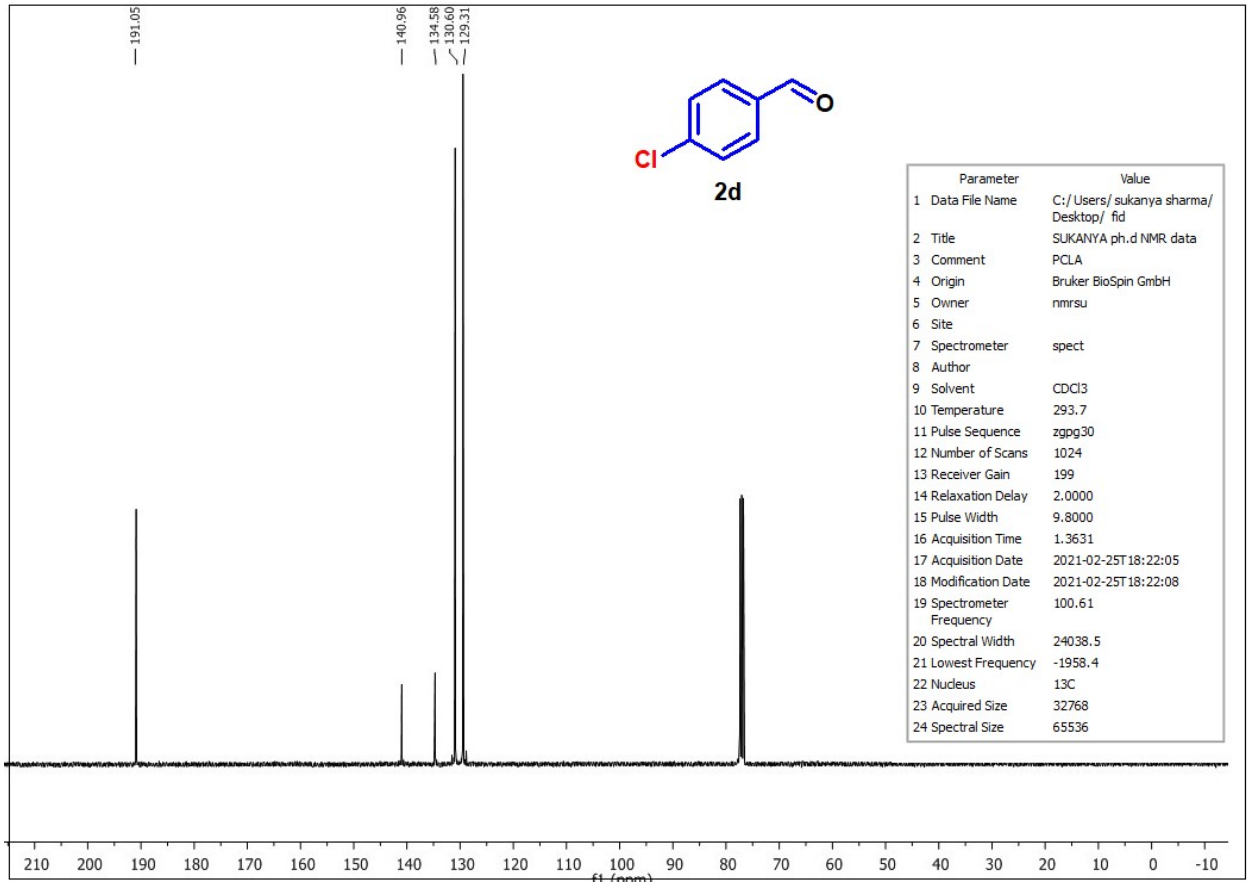


Figure 8. ^{13}C NMR spectra of 4-Chloro benzaldehyde.

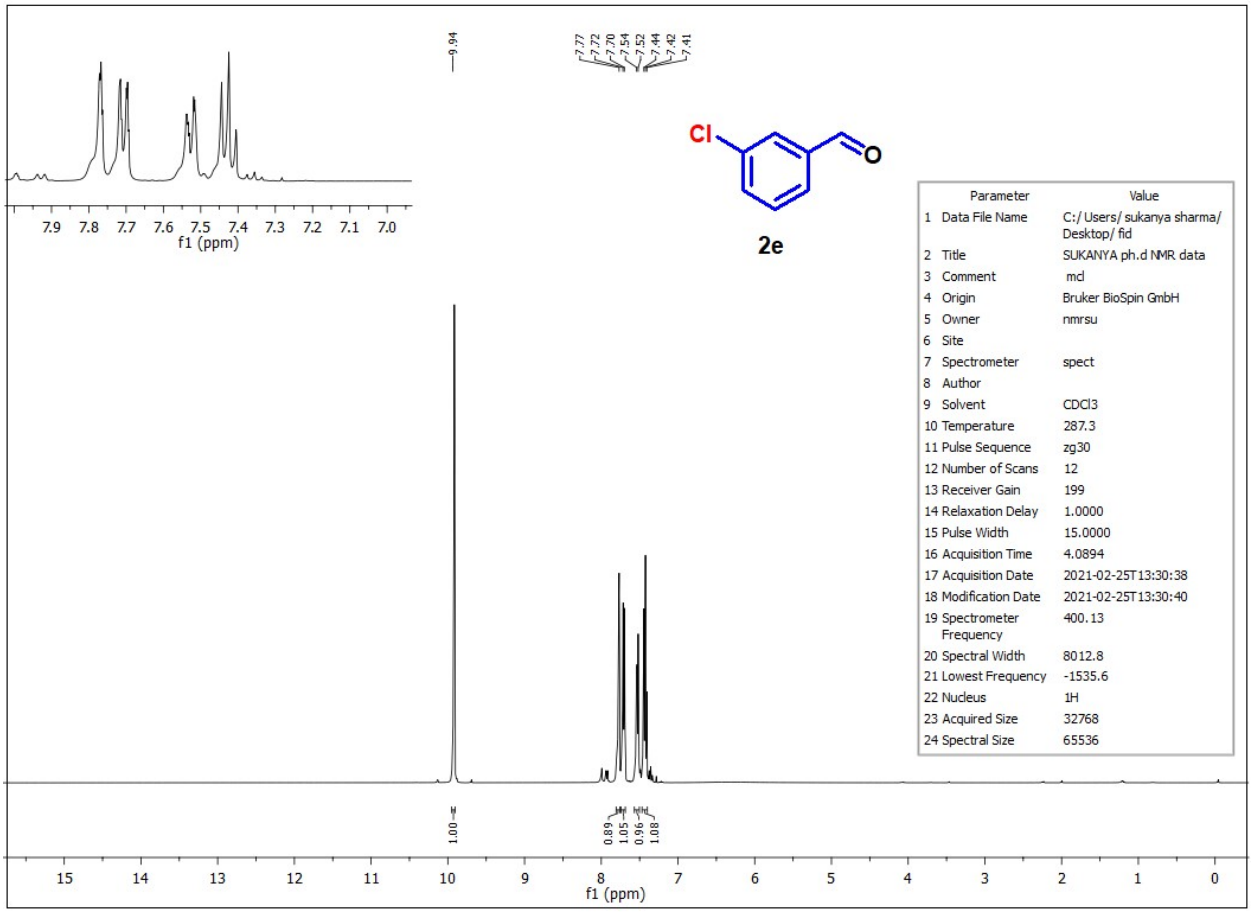


Figure 9. ^{1}H NMR spectra of 3- Chlorobenzaldehyde.

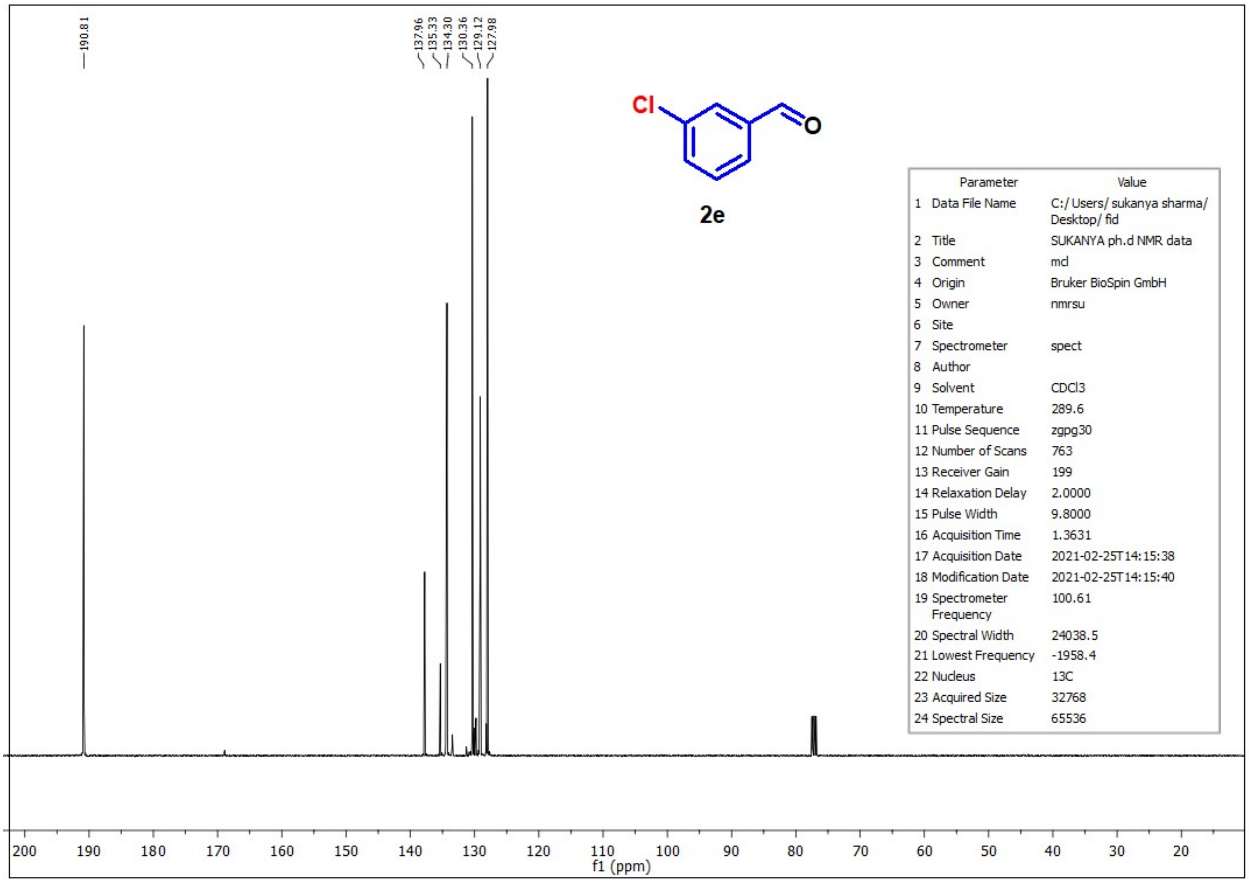


Figure 10. ^{13}C NMR spectra of 3-Chlorobenzaldehyde.

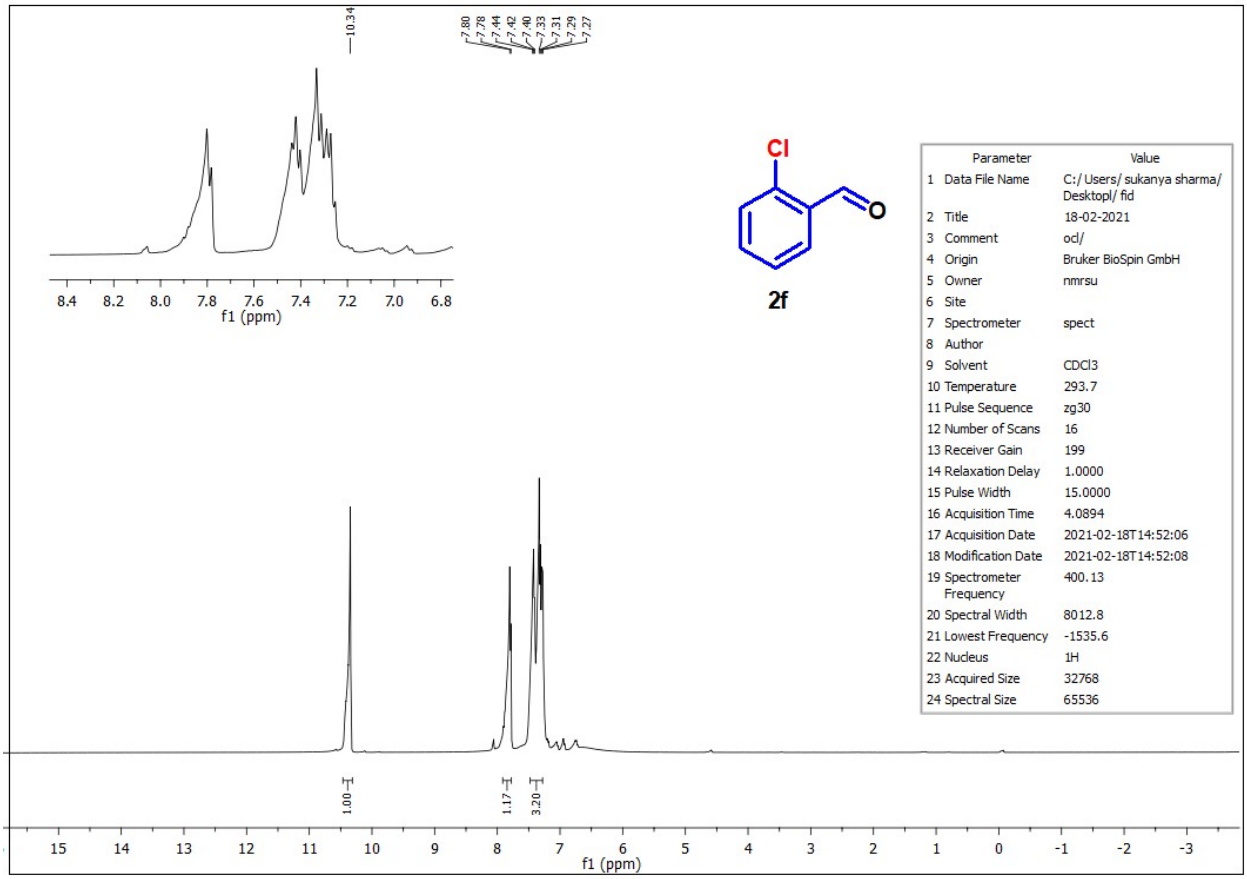


Figure 11. ^{1}H NMR spectra of 2-Chlorobenzaldehyde.

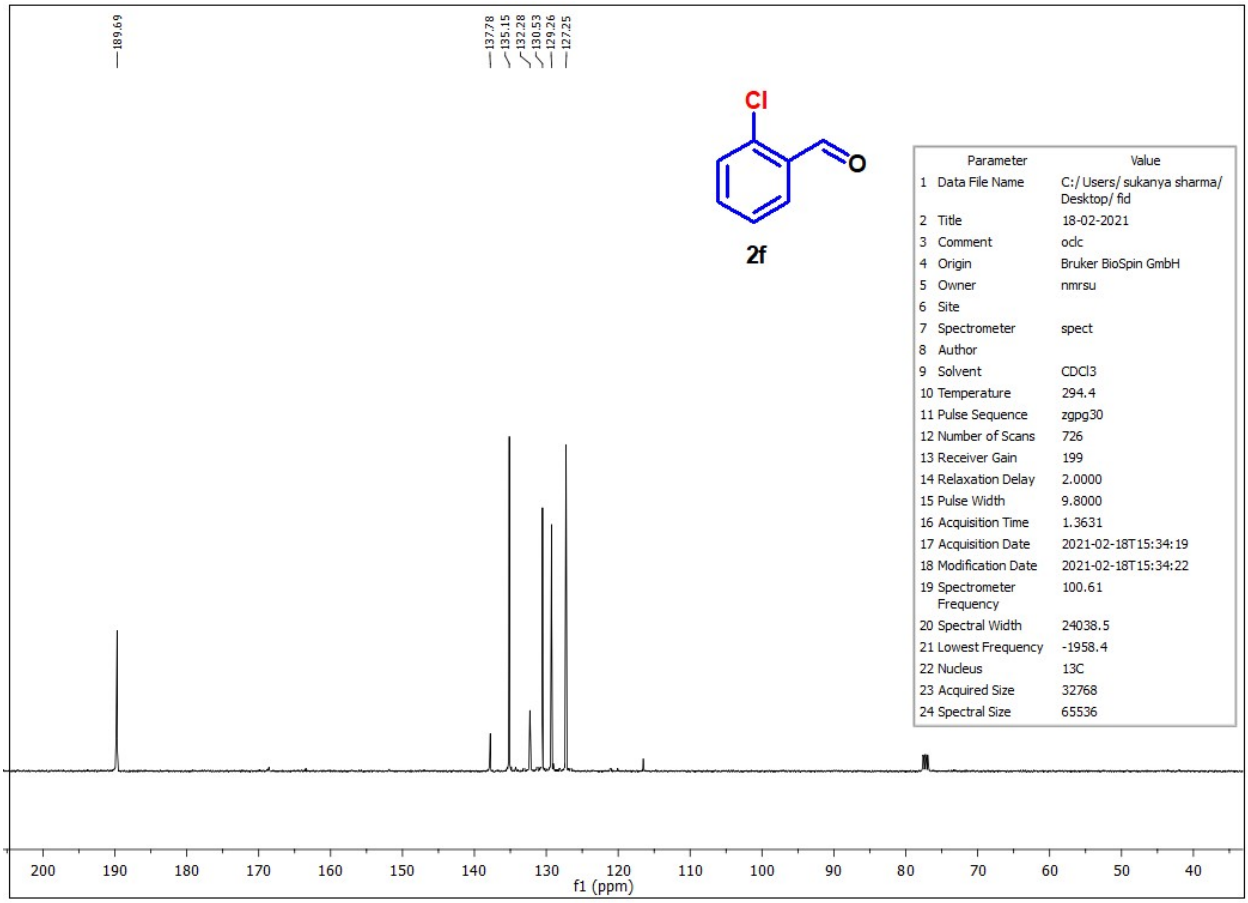


Figure 12. ^{13}C NMR spectra of 2-Chlorobenzaldehyde.

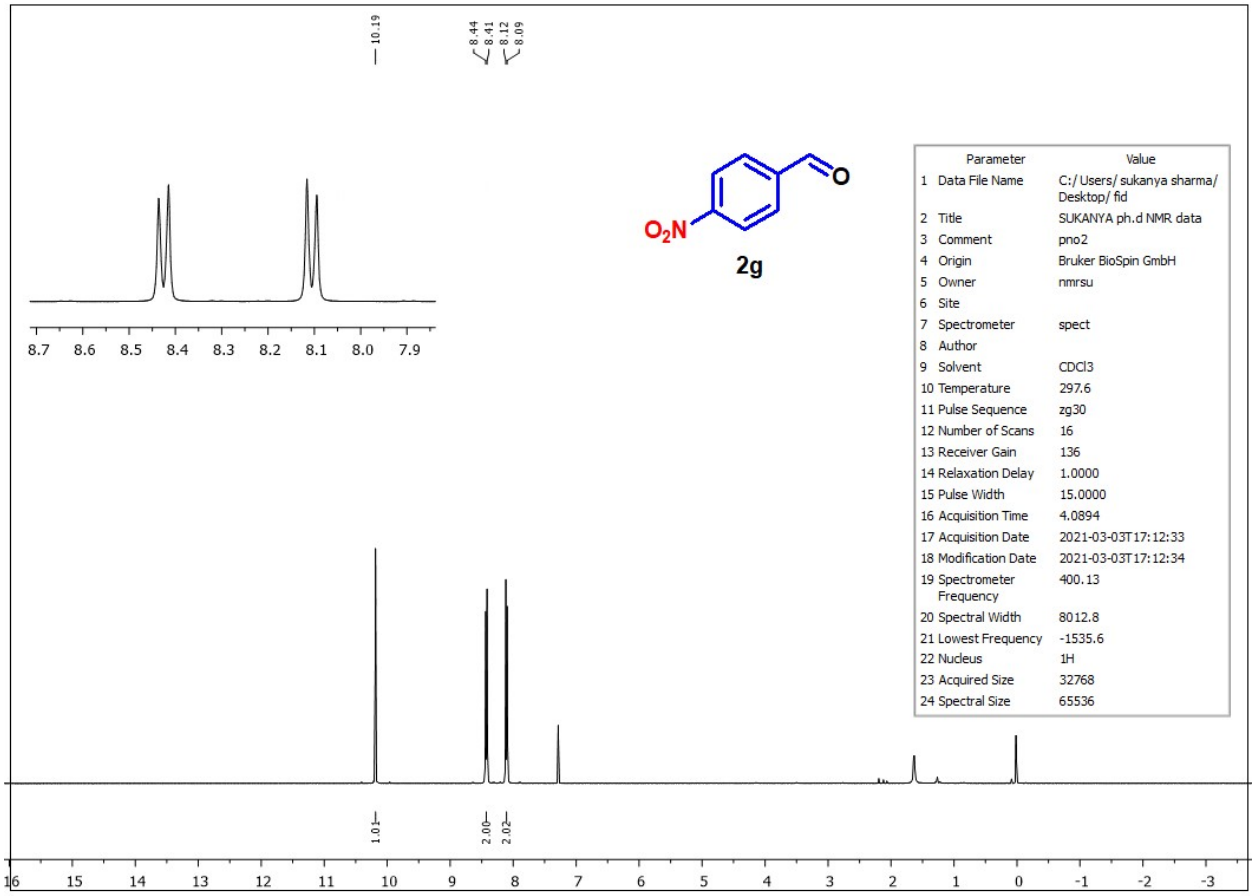


Figure 13. ^{1}H NMR spectra of 4-Nitrobenzaldehyde.

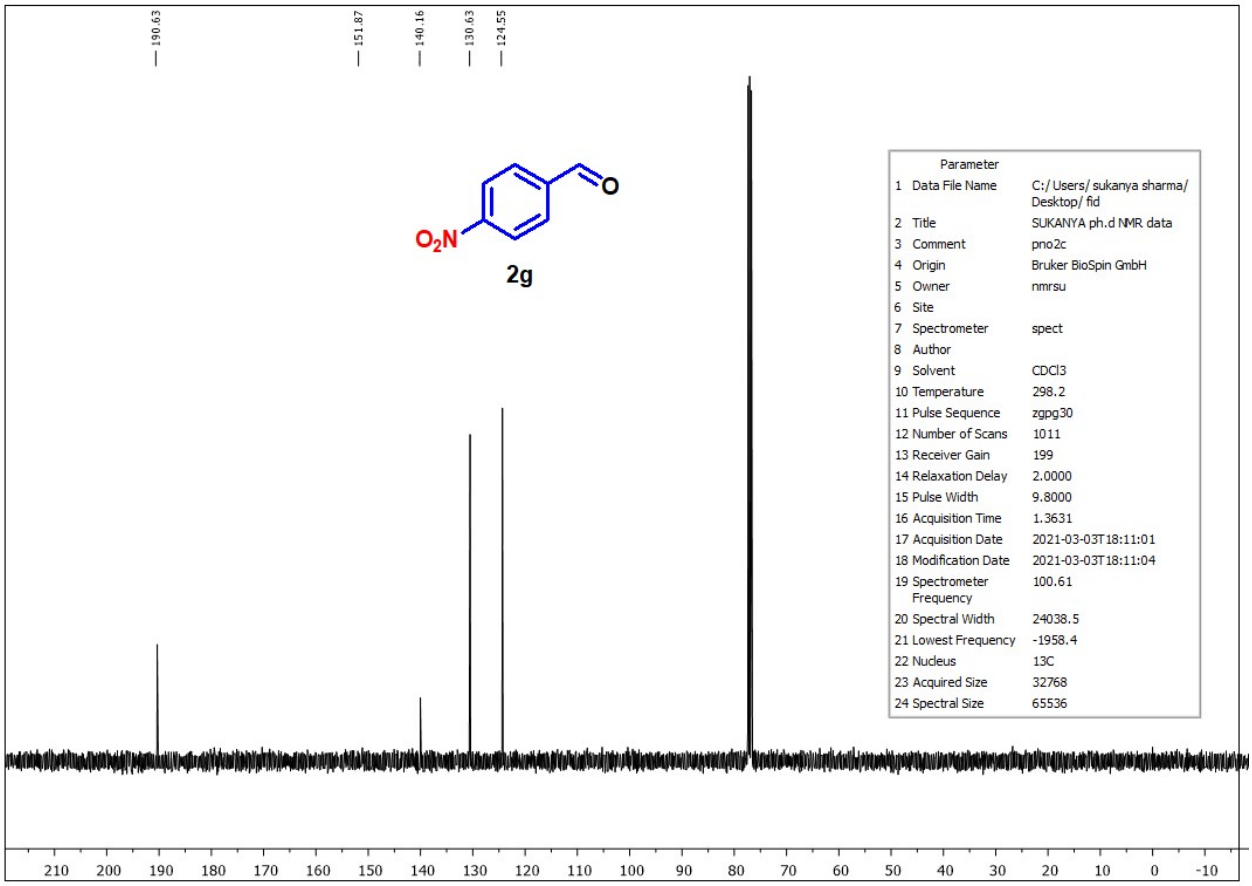


Figure 14. ^{13}C NMR spectra of 4-Nitrobenzaldehyde.

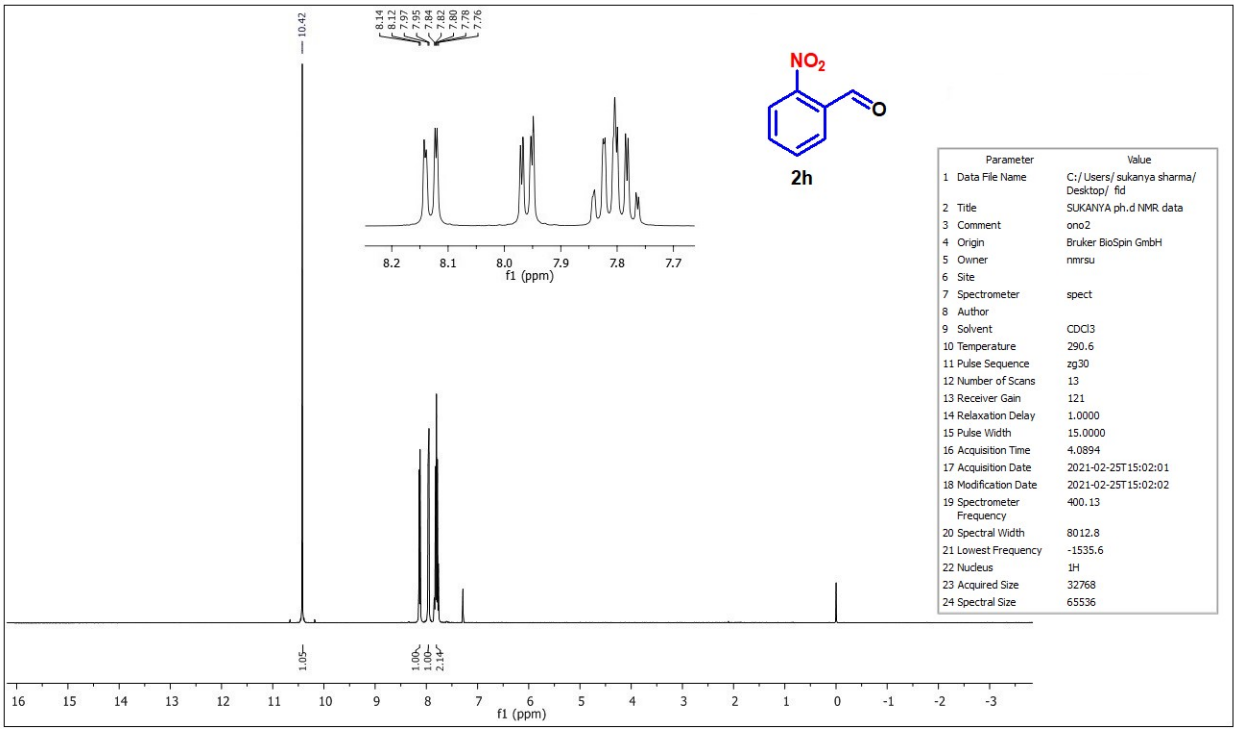


Figure 15. ^{1}H NMR spectra of 2-Nitrobenzaldehyde.

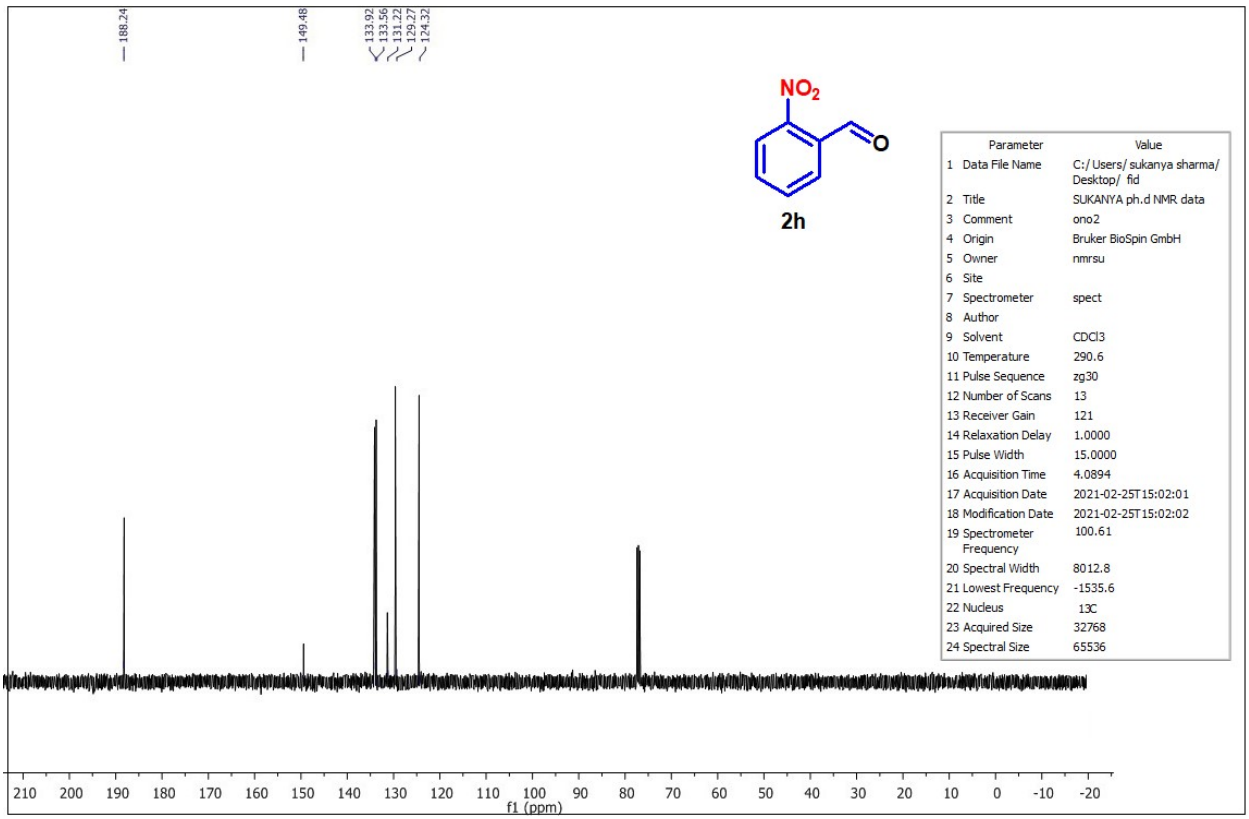


Figure 16. ^{13}C NMR spectra of 2-Nitrobenzaldehyde.

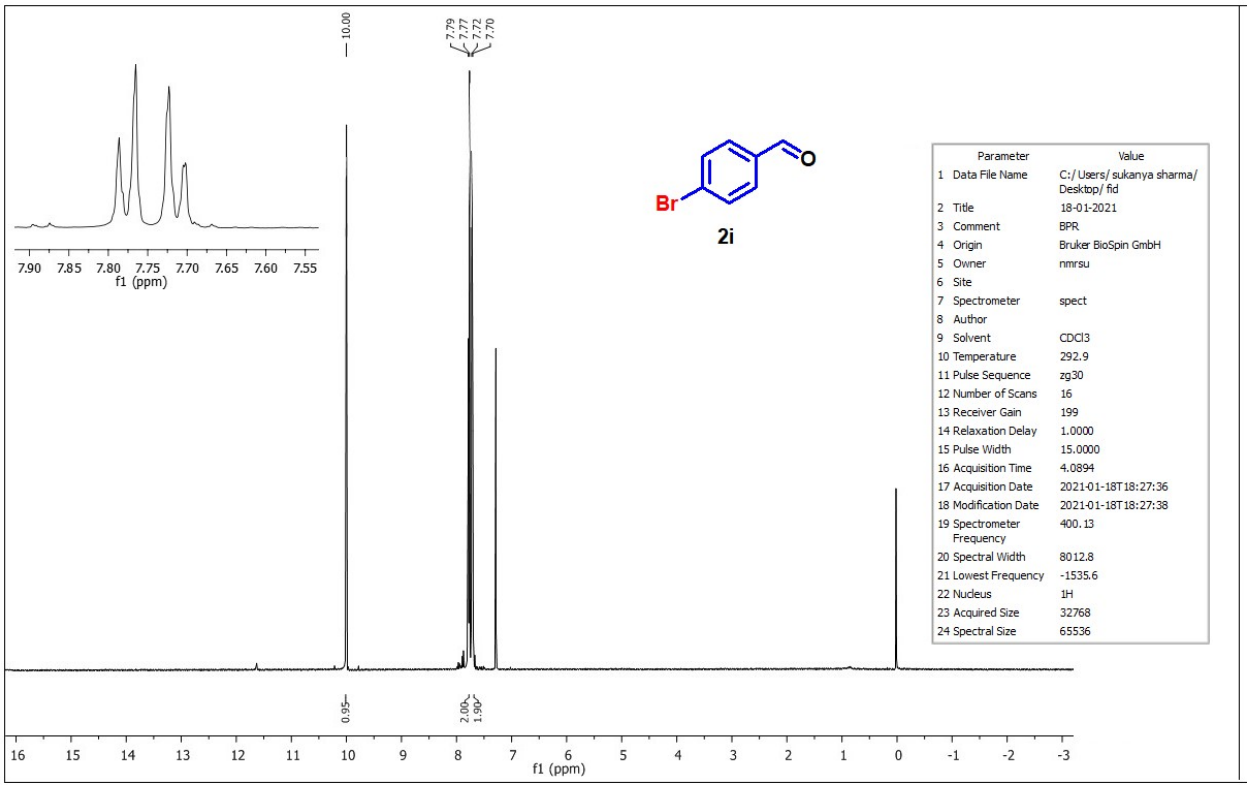


Figure 17. ^{1}H NMR spectra of 4-Bromobenzaldehyde.

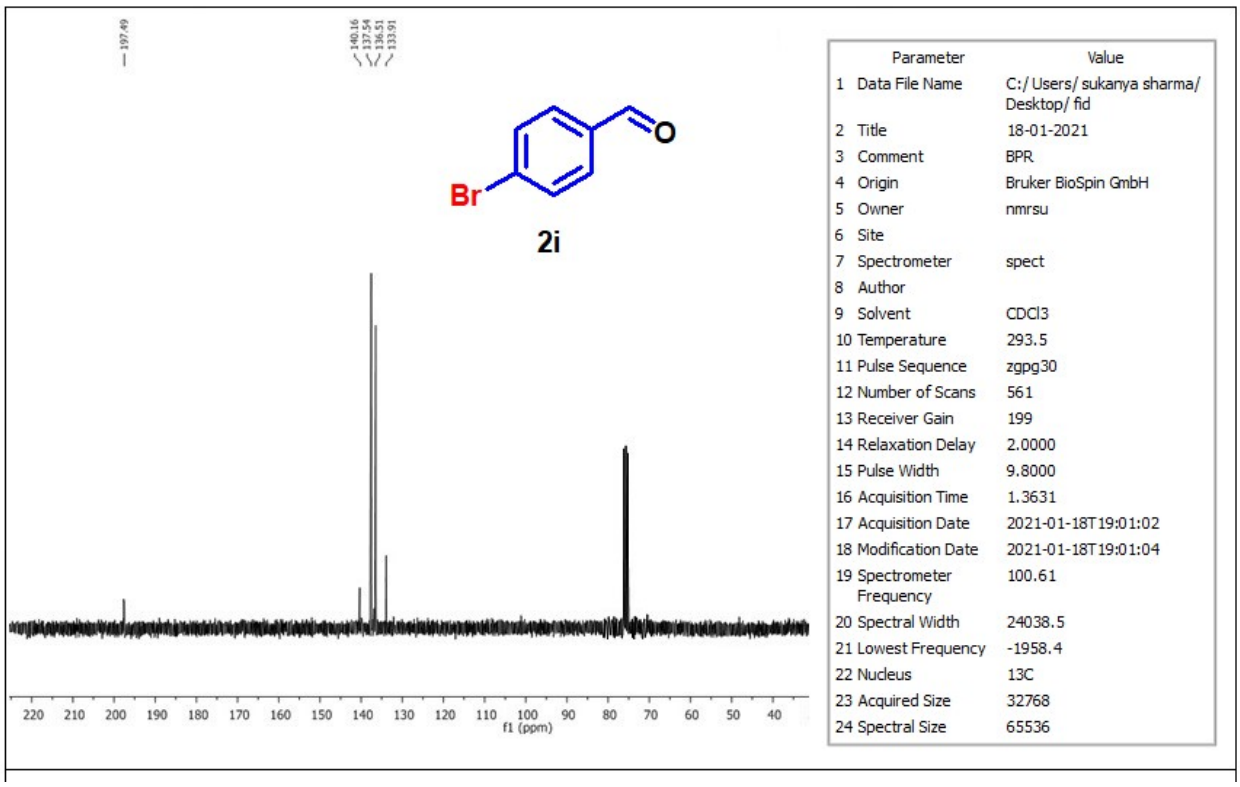


Figure 18. ^{13}C NMR spectra of 4-Bromobenzaldehyde.

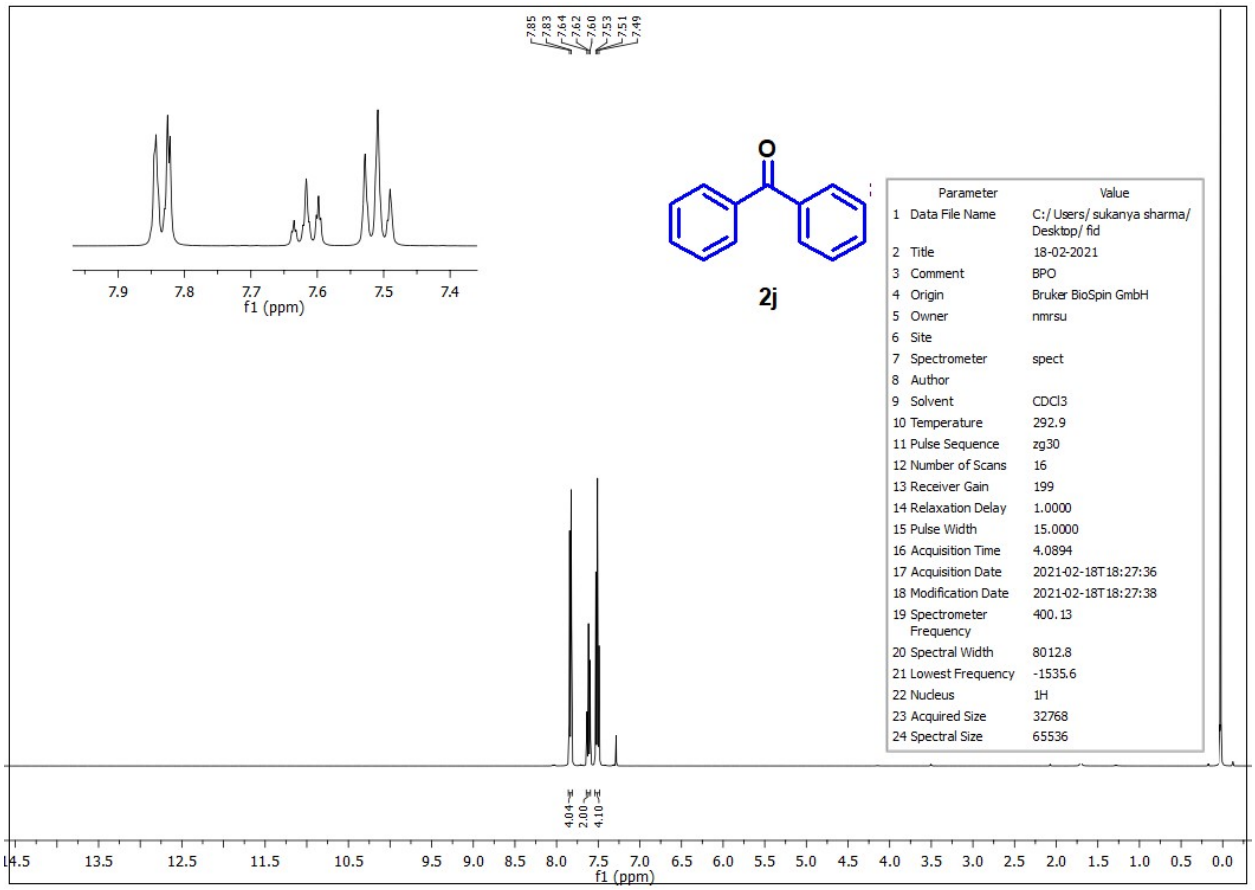


Figure 19. ^{1}H NMR spectra of benzophenone.

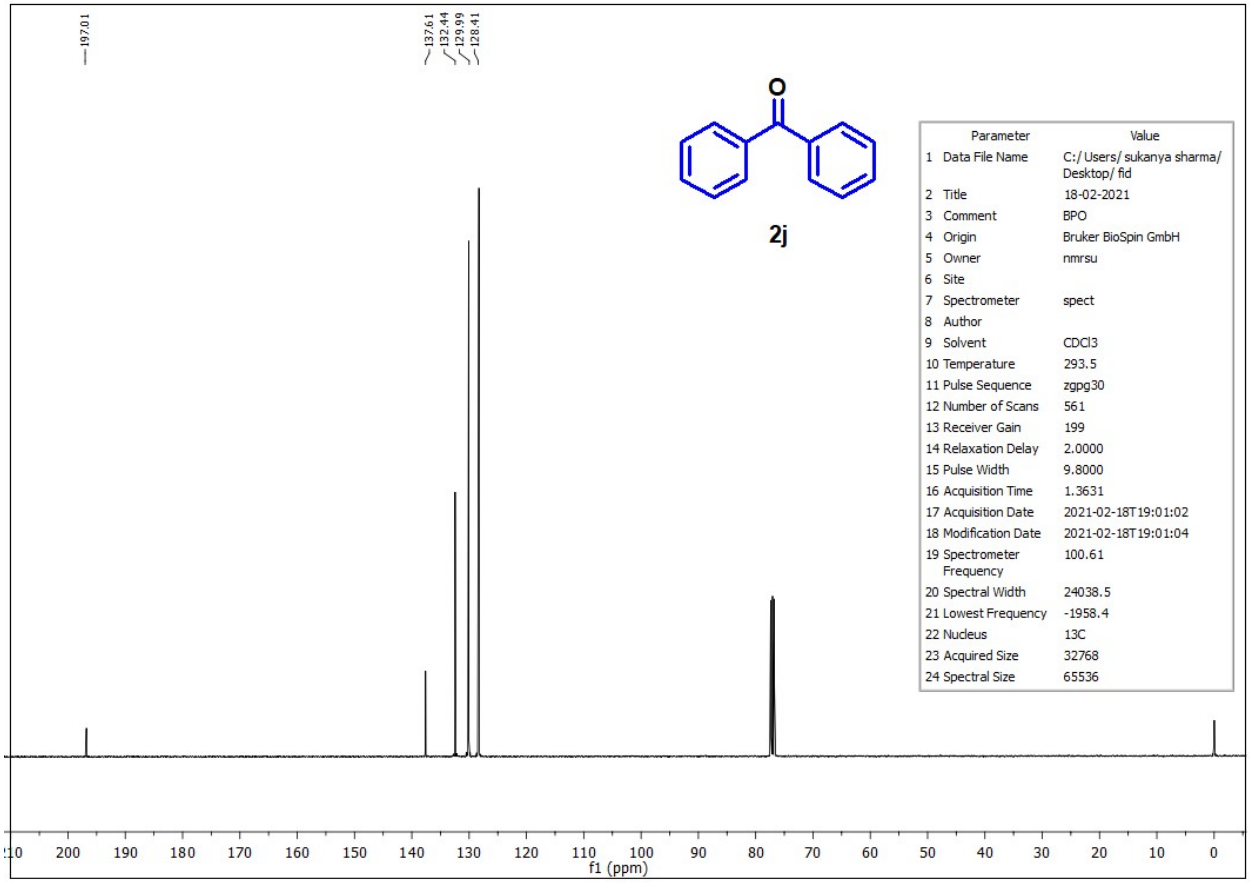


Figure 20. ^{13}C NMR spectra of benzophenone.

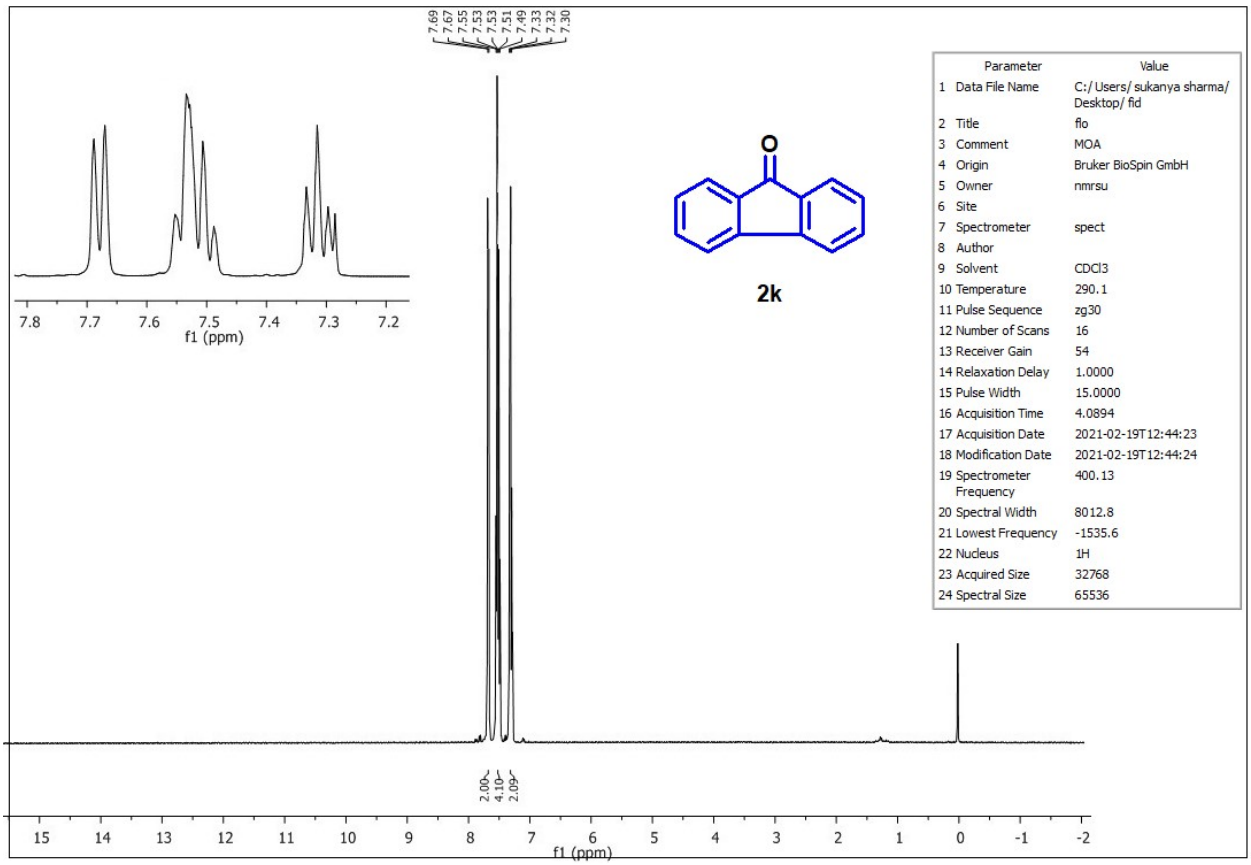


Figure 21. ^{1}H NMR spectra of fluorenone.

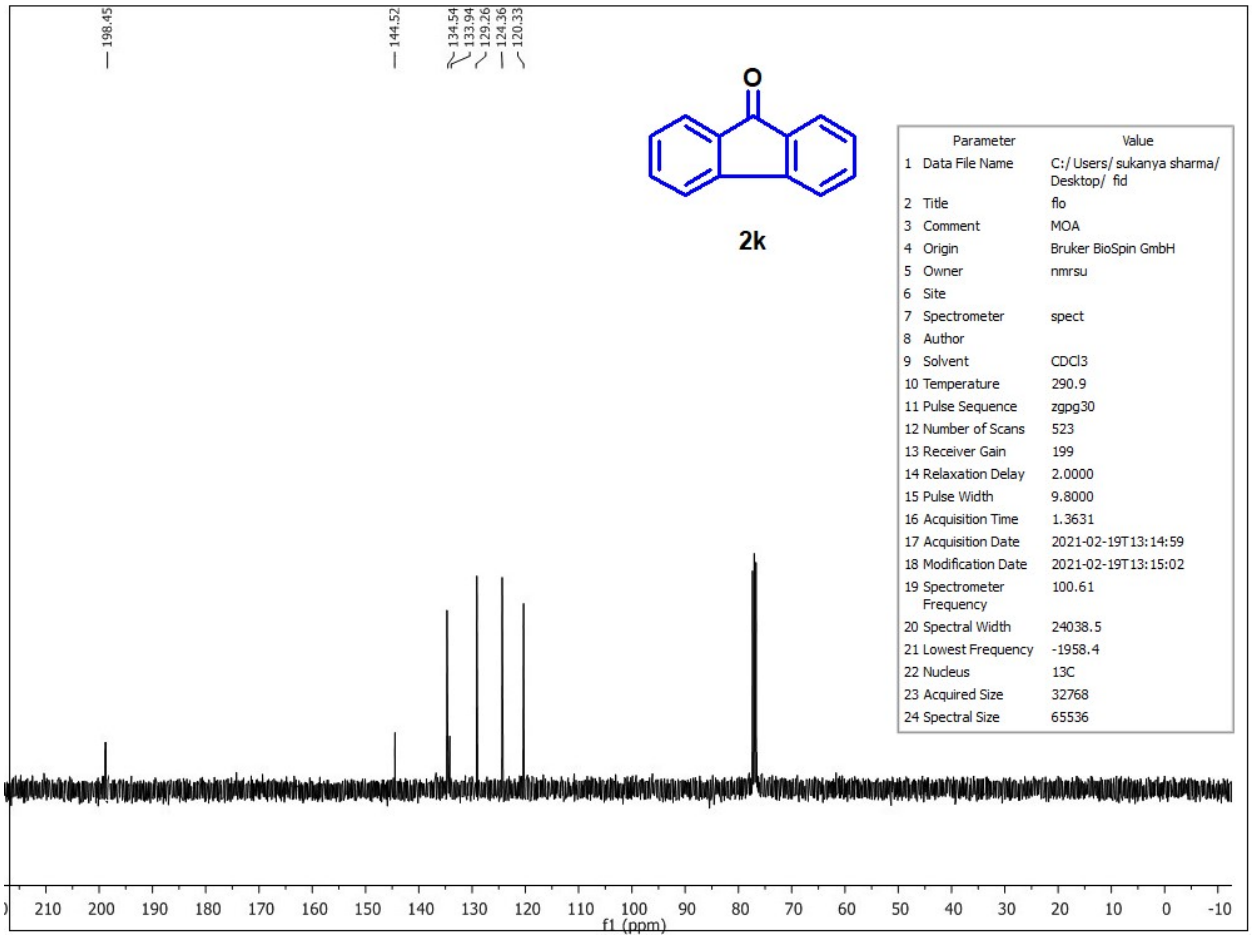


Figure 22. ^{13}C NMR spectra of fluorenone.

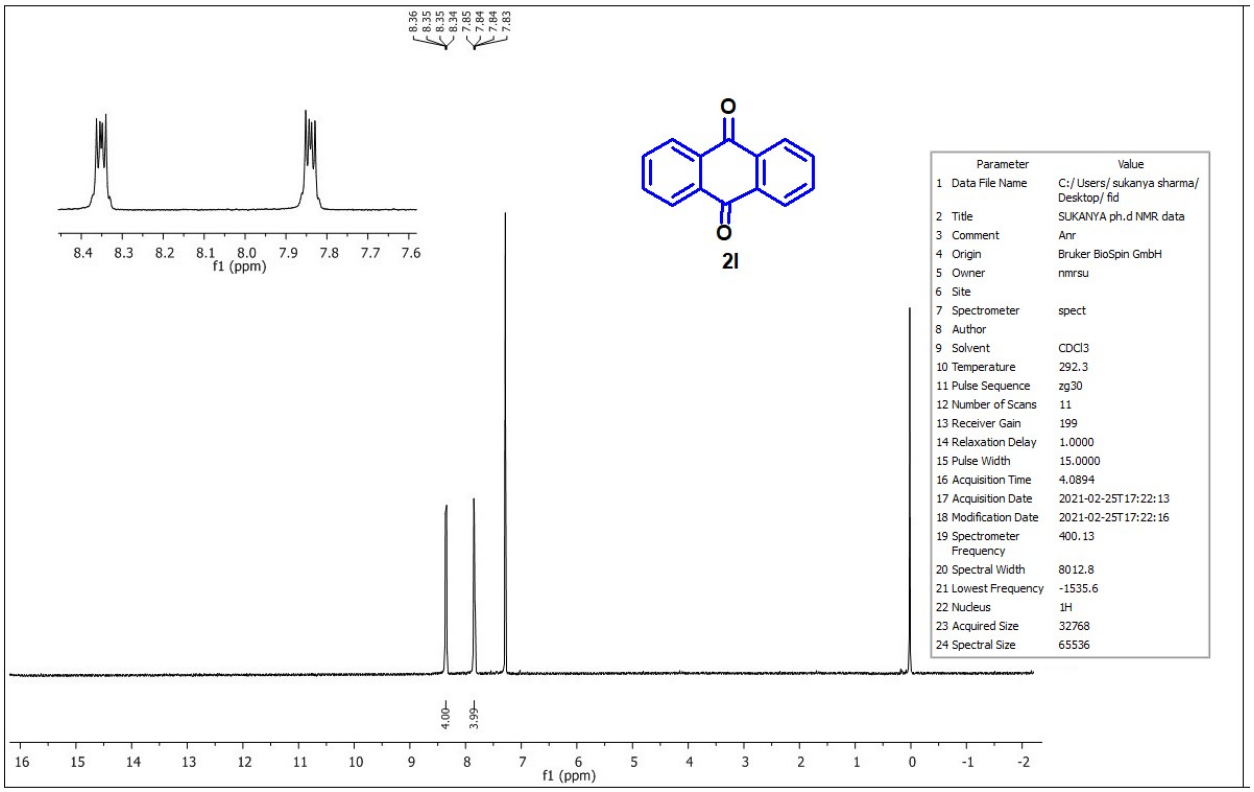


Figure 23. ^{1}H NMR spectra of anthraquinone.

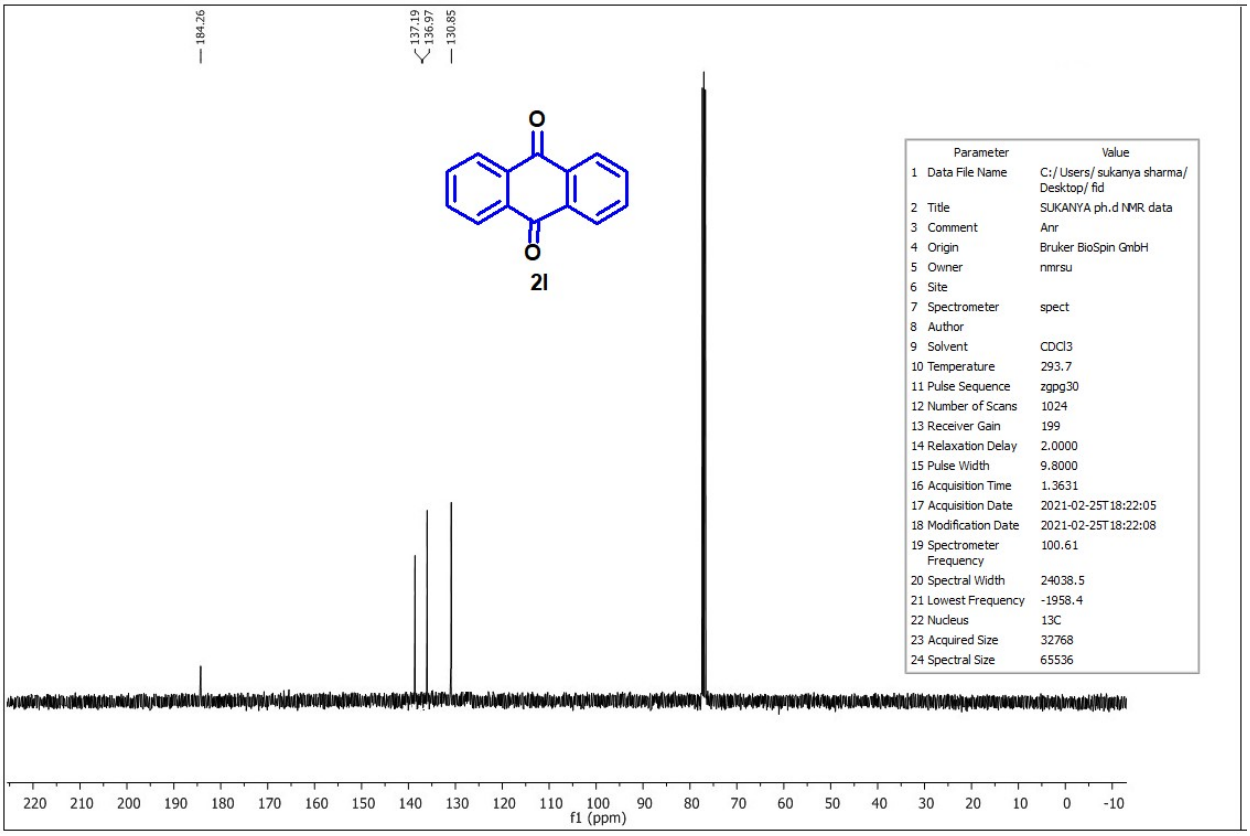


Figure 24. ^{13}C NMR spectra of anthraquinone.

S5. 1H NMR and 13C NMR spectra of compounds listed in Table 5

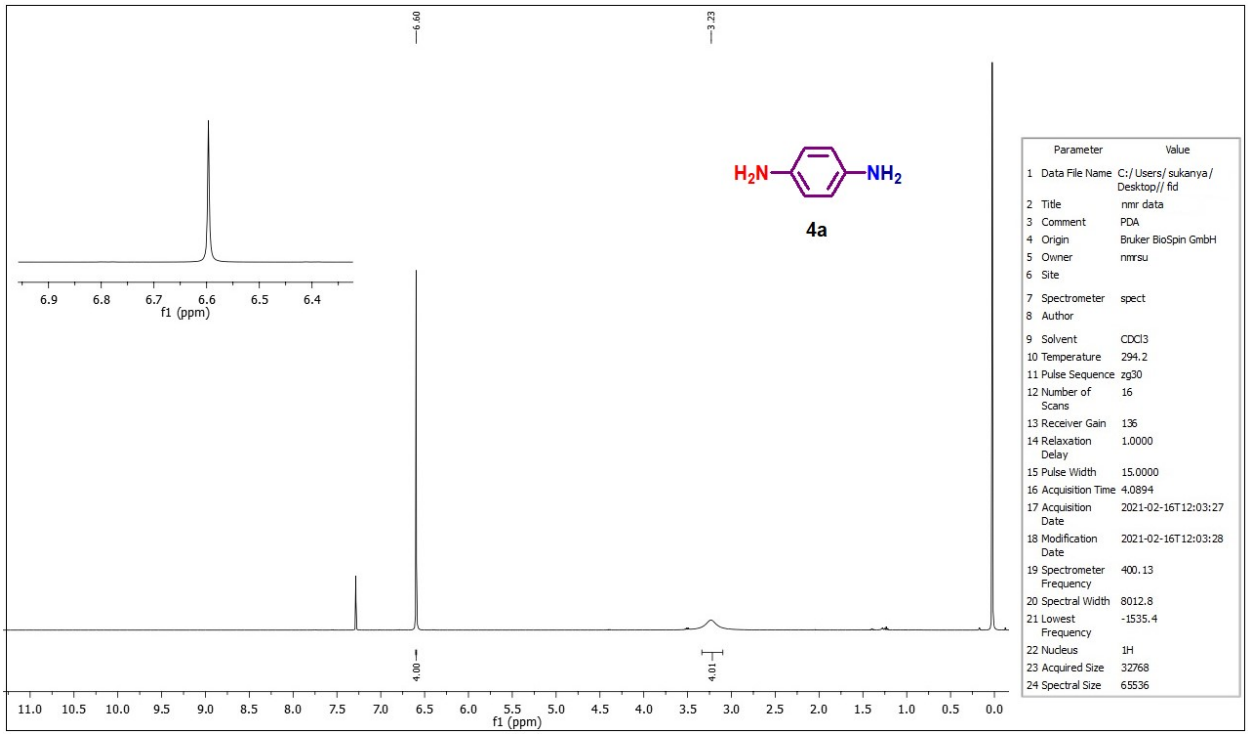


Figure 25. ^{1}H NMR spectra of 1,4-diaminobenzene.

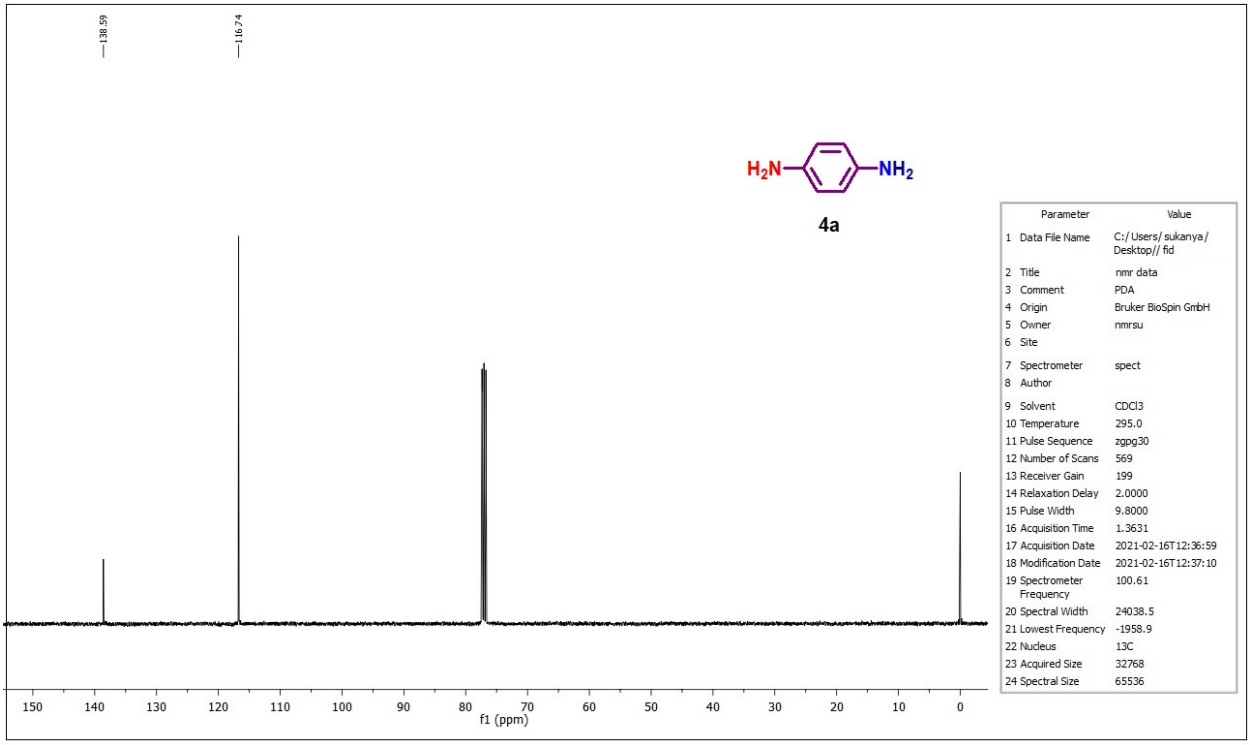


Figure 26. ^{13}C NMR spectra of 1,4-diaminobenzene.

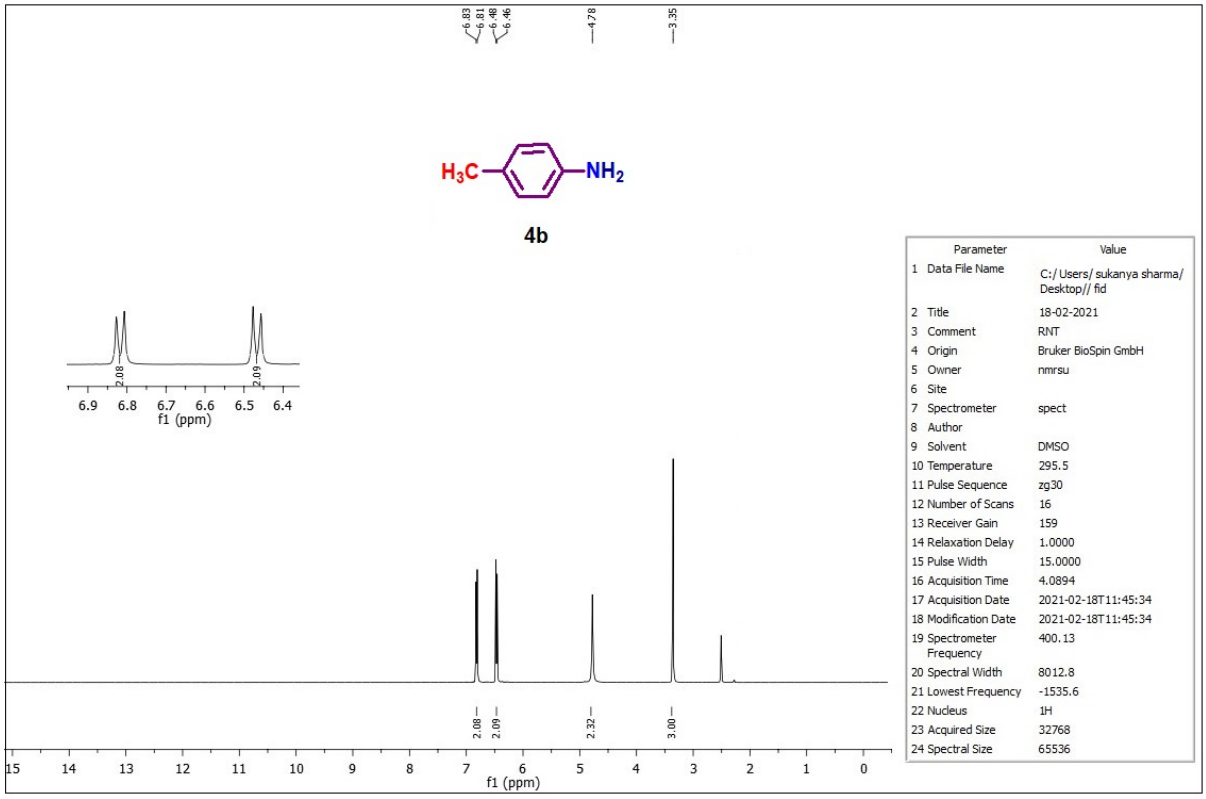


Figure 27. ^{1}H NMR spectra of 4-methylaniline.

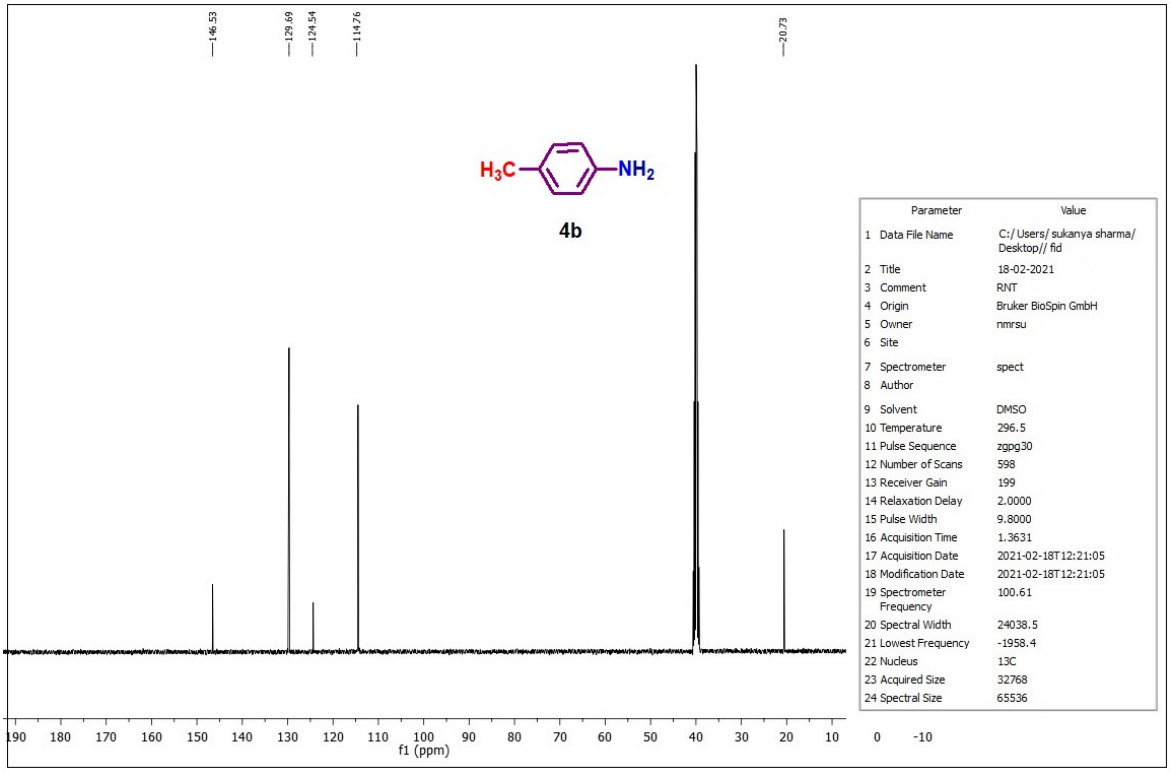


Figure 28. ^{13}C NMR spectra of 4-methylaniline

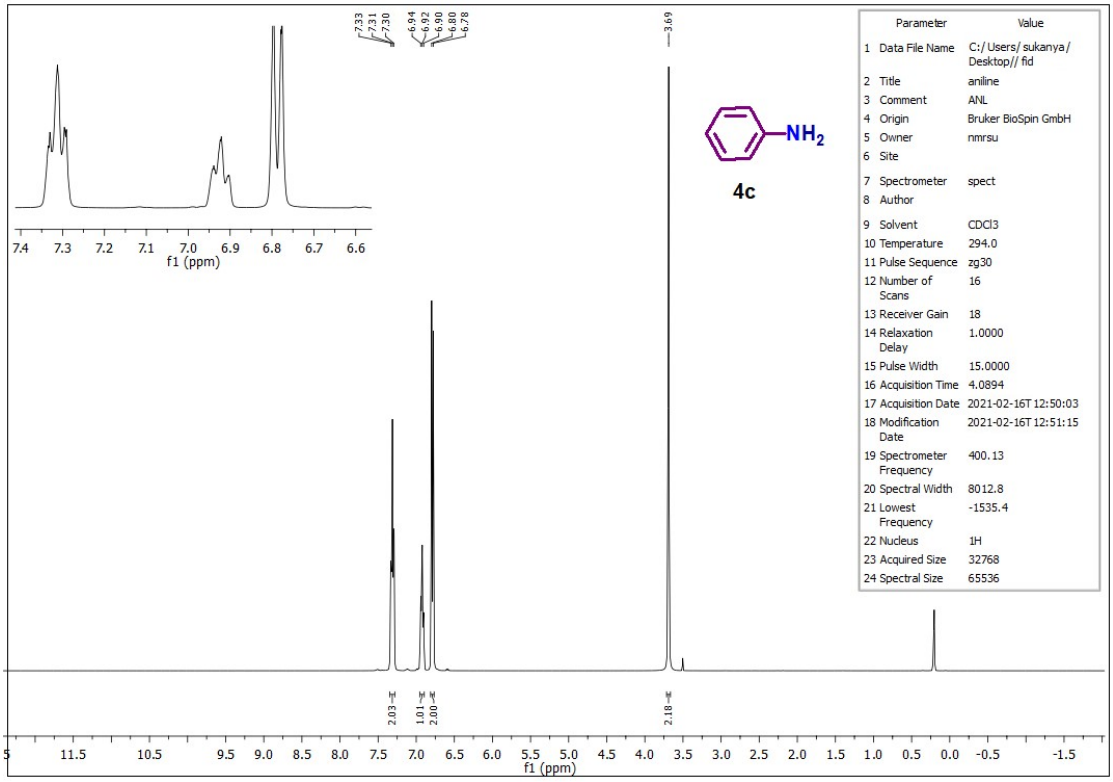


Figure 29. ^{1}H NMR spectra of aniline.

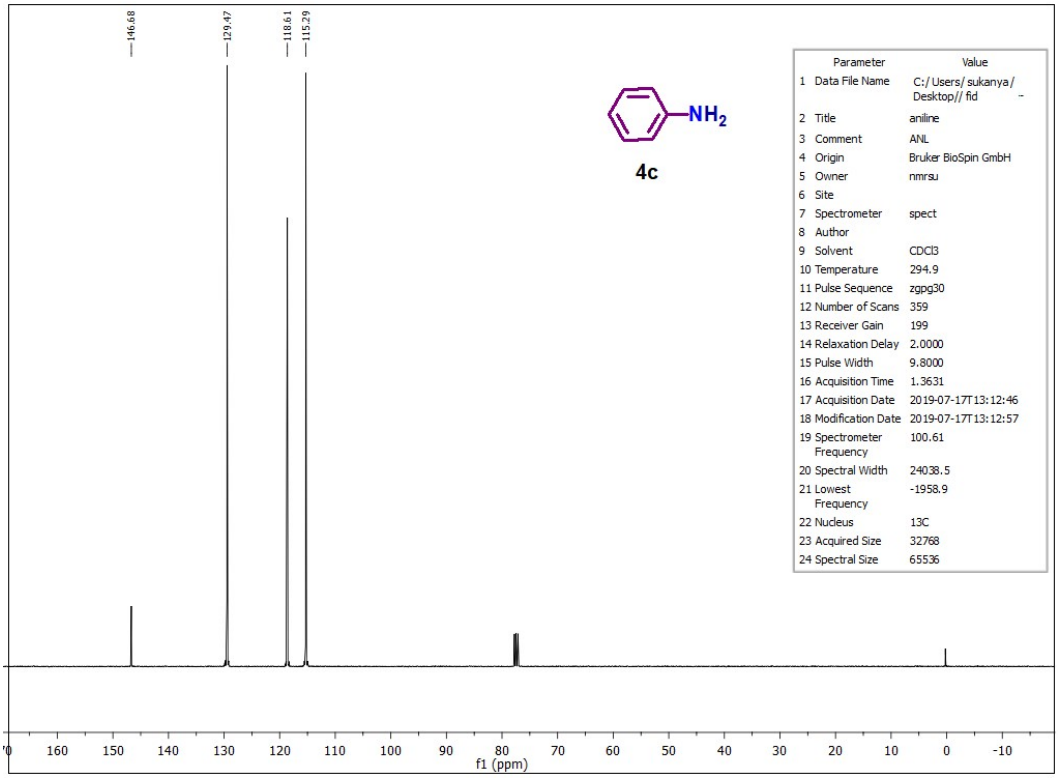


Figure 30. ^{13}C NMR spectra of aniline.

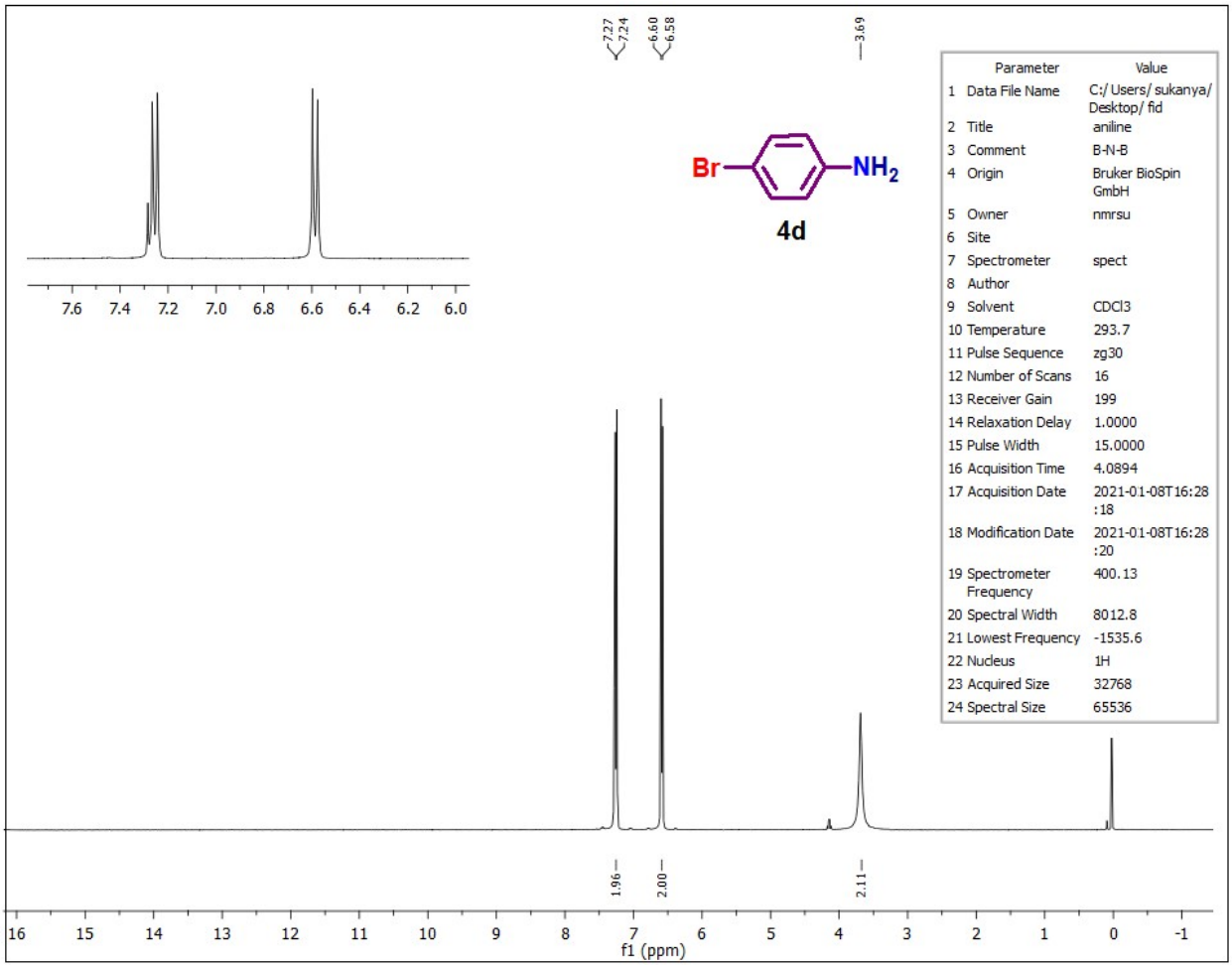


Figure 31. ^{1}H NMR spectra of 4-bromoaniline.

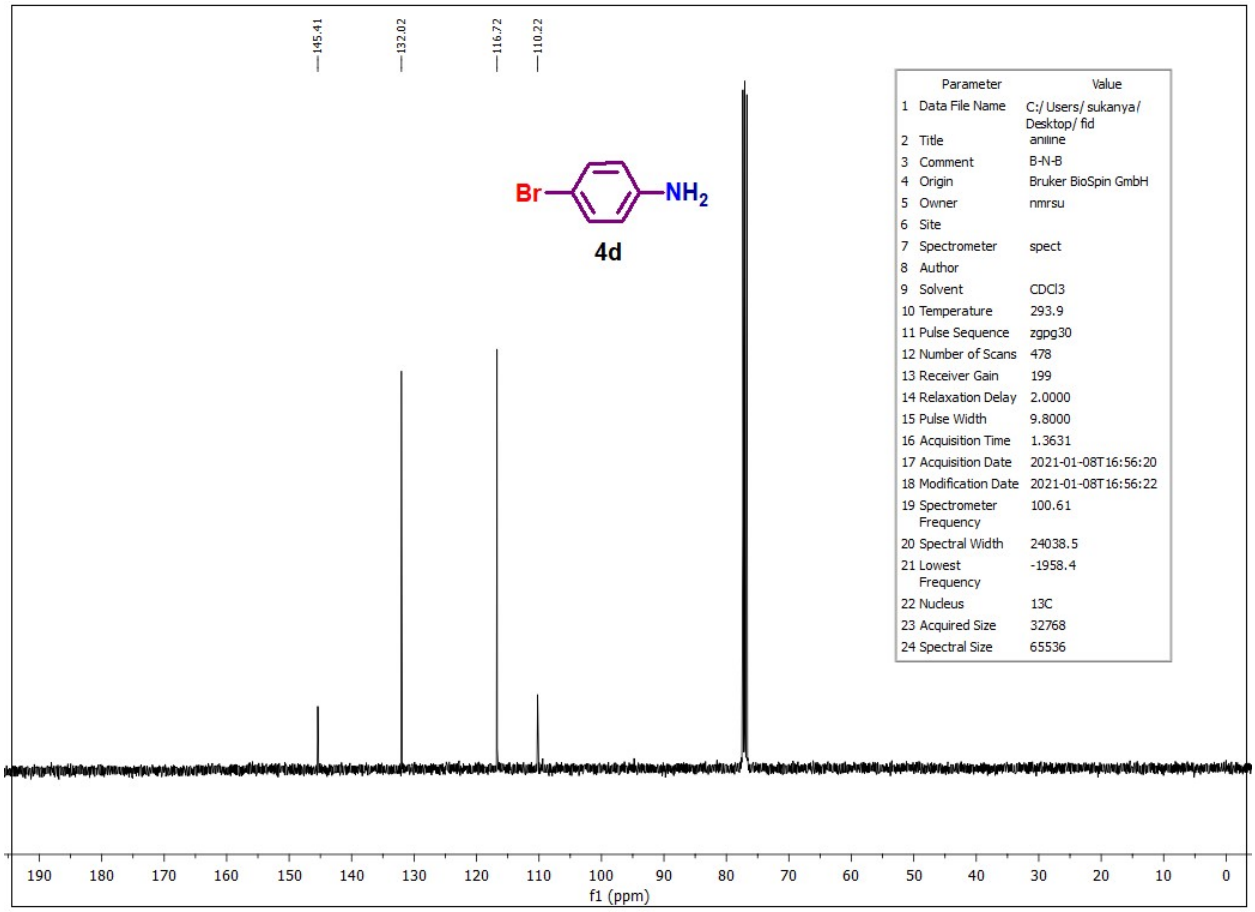


Figure 32. ^{13}C NMR spectra of 4-bromoaniline.

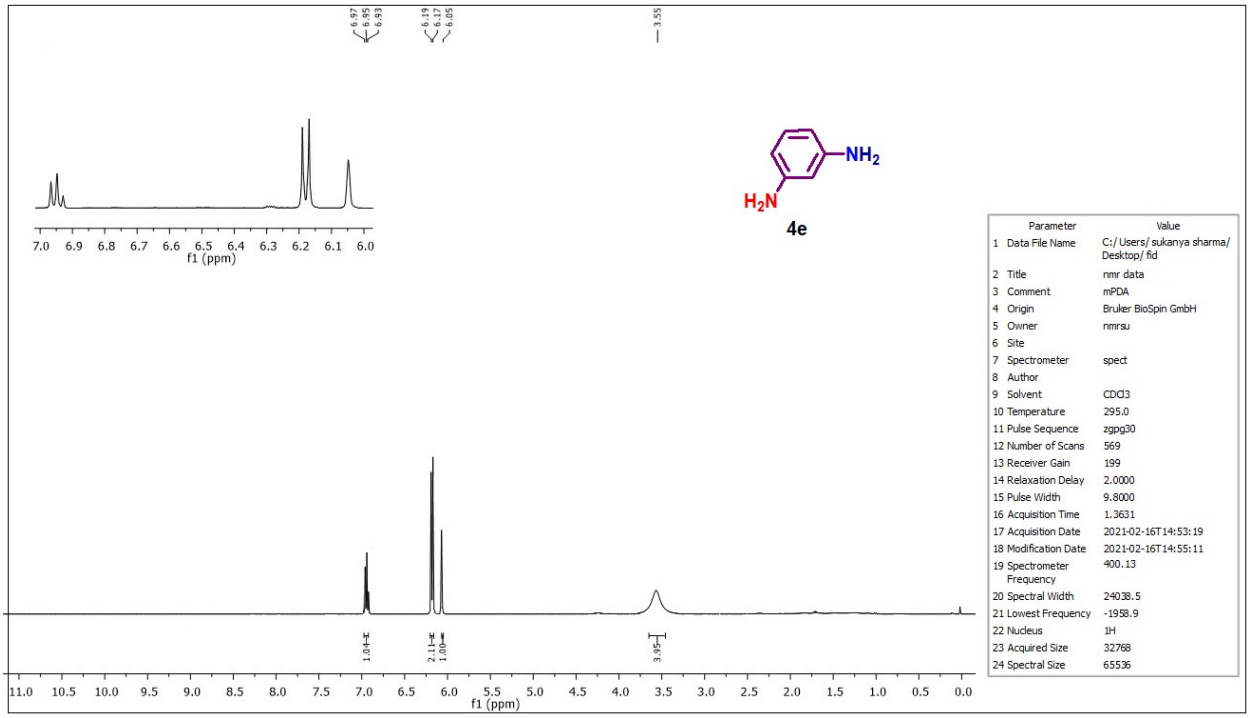


Figure 33. ^{1}H NMR spectra of 1,3-diaminobenzene.

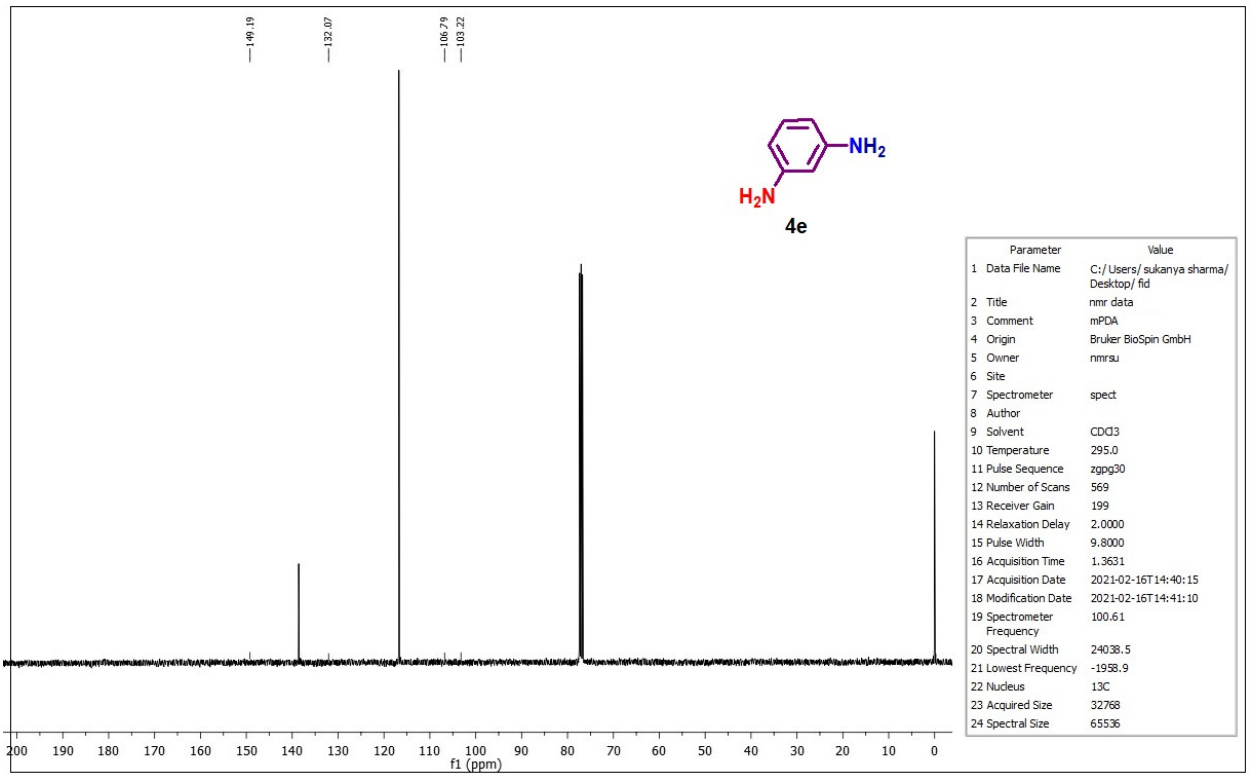


Figure 34. ^{13}C NMR spectra of 1,3-diaminobenzene.

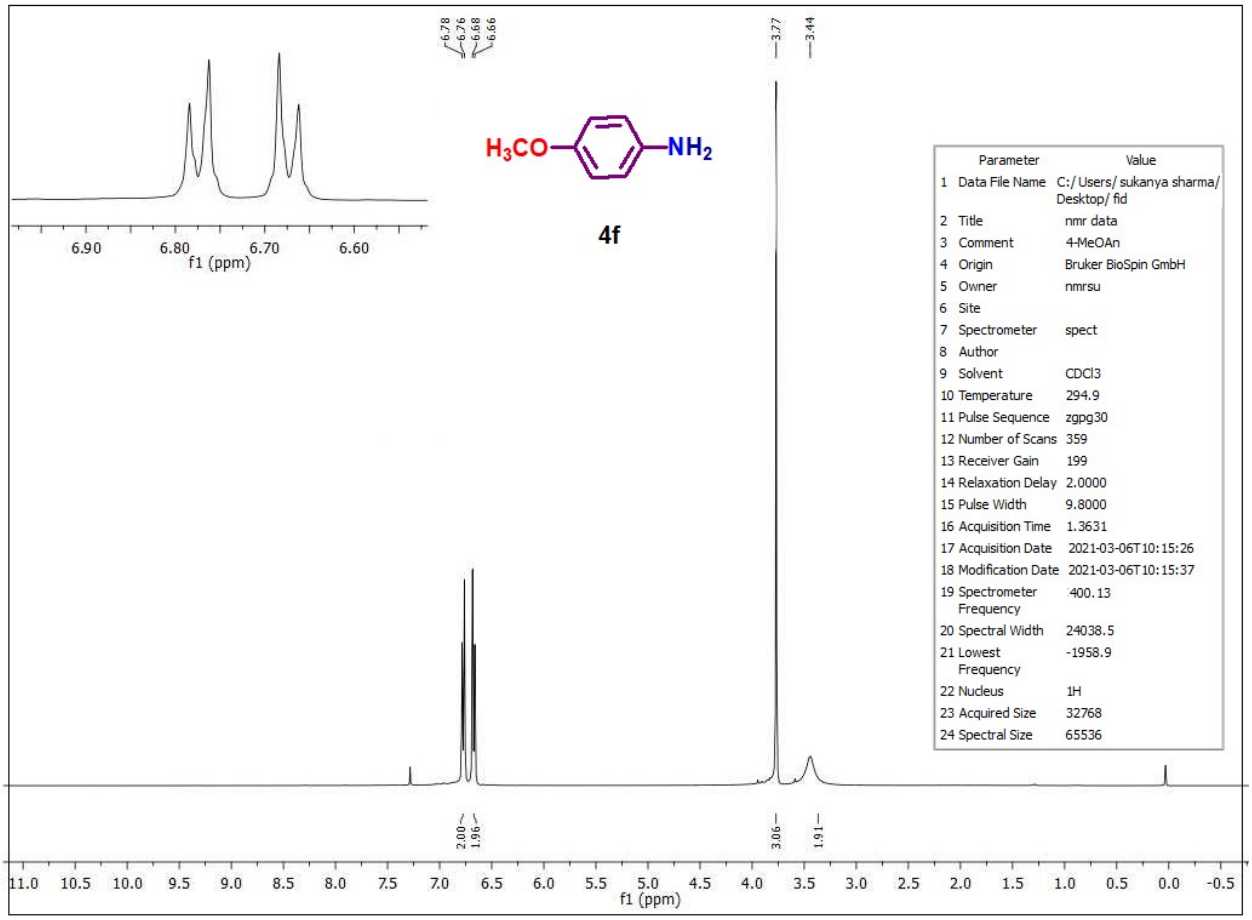


Figure 35. ^{1}H NMR spectra of 4-methoxyaniline.

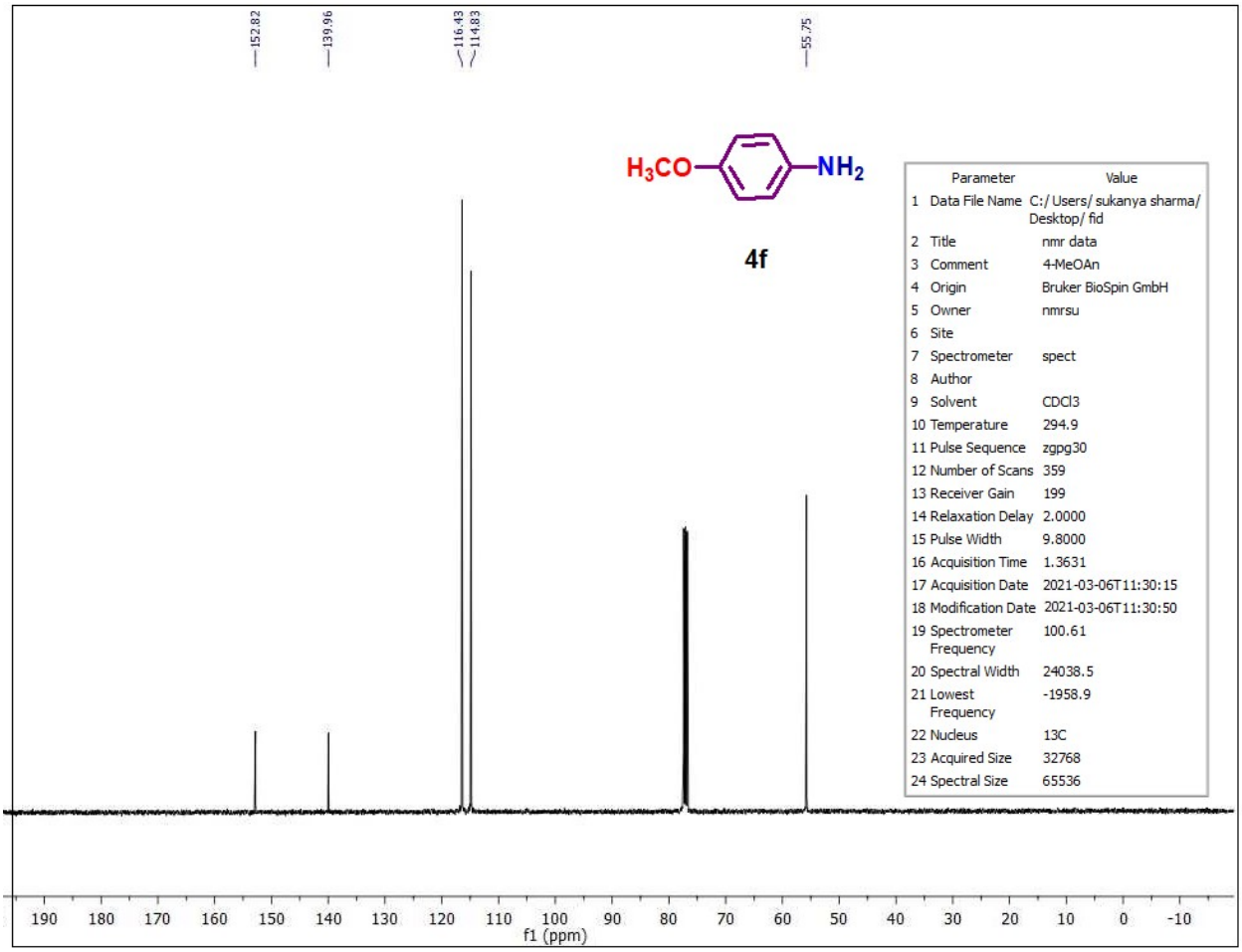


Figure 36. ^{13}C NMR spectra of 4-methoxyaniline.

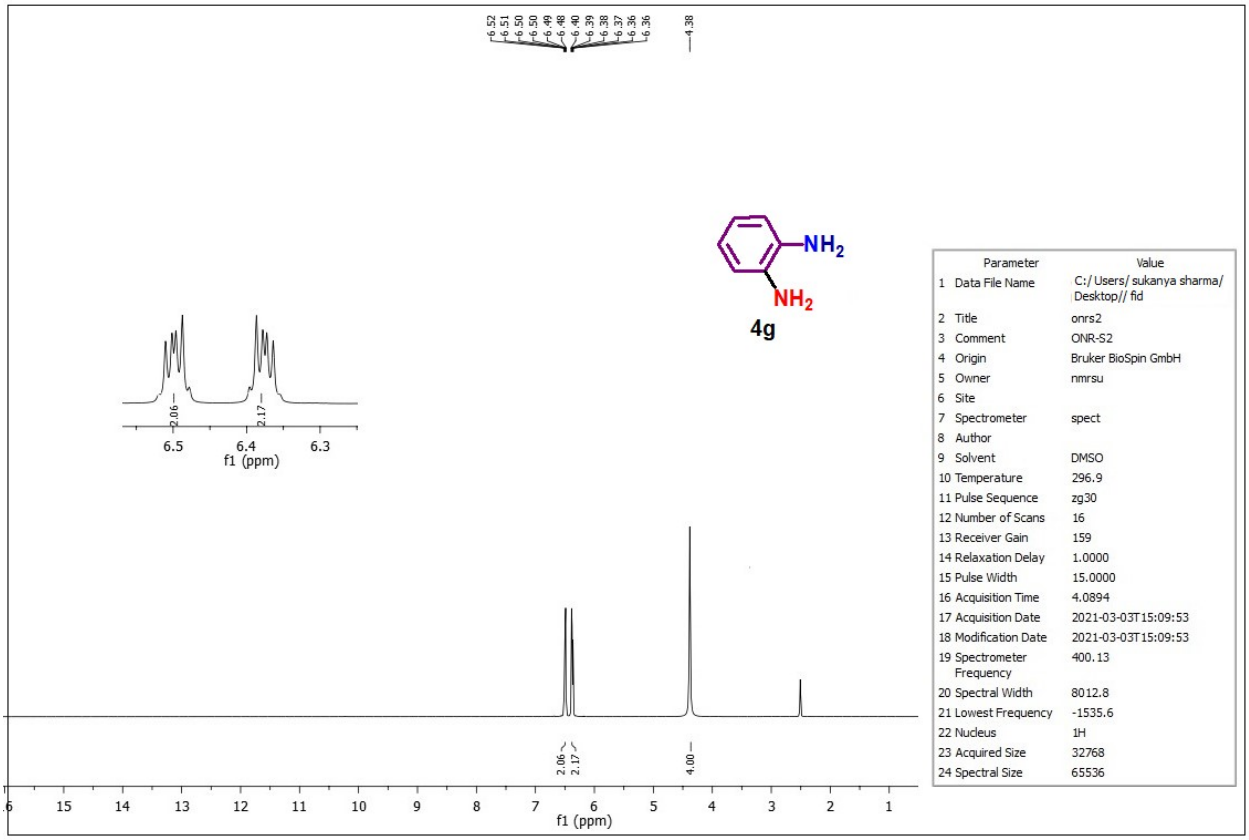


Figure 37. ^{1}H NMR spectra of 1,2-diaminobenzene.

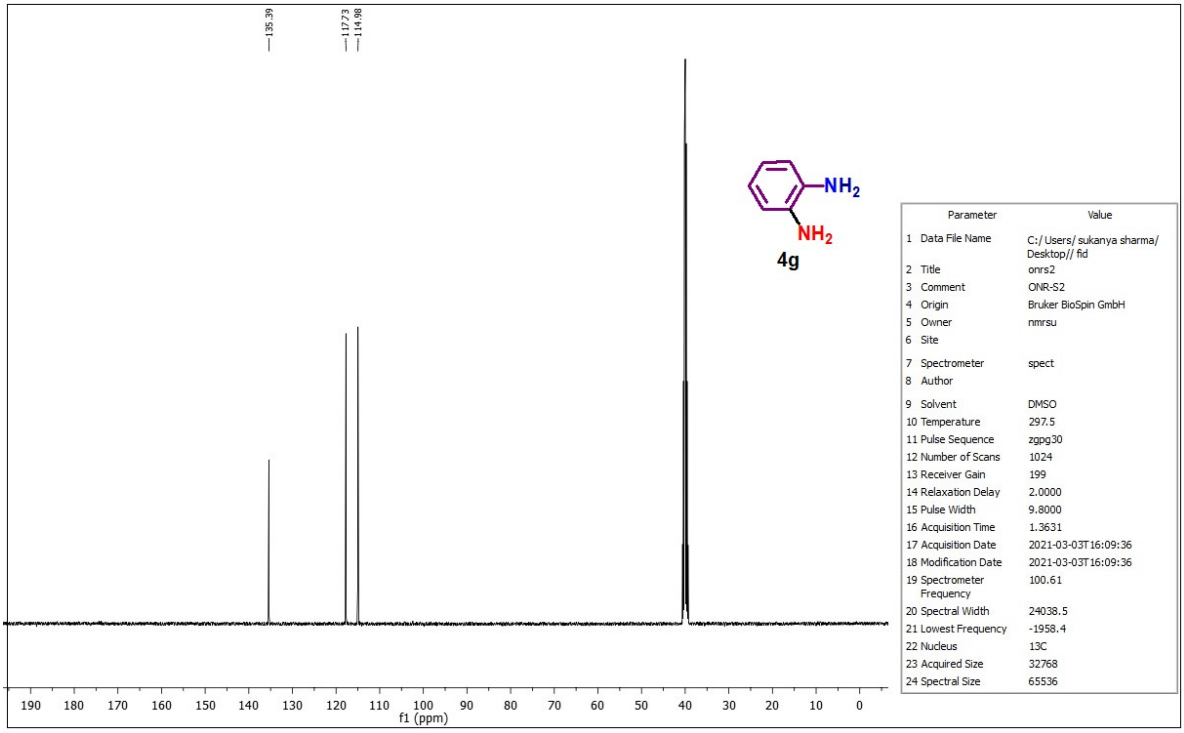


Figure 38. ^{13}C NMR spectra of 1,2-diaminobenzene

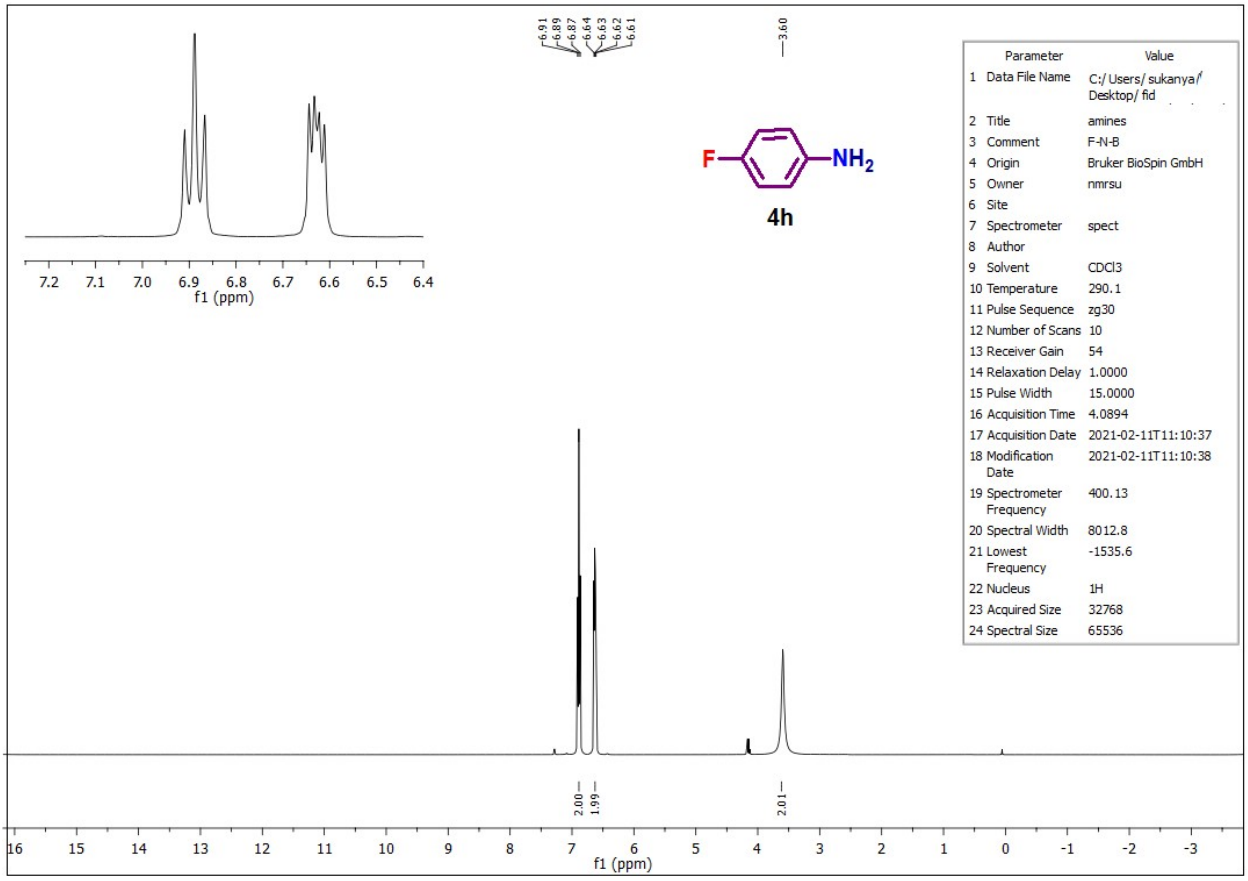


Figure 39. ^{1}H NMR spectra of 4-fluoroaniline.

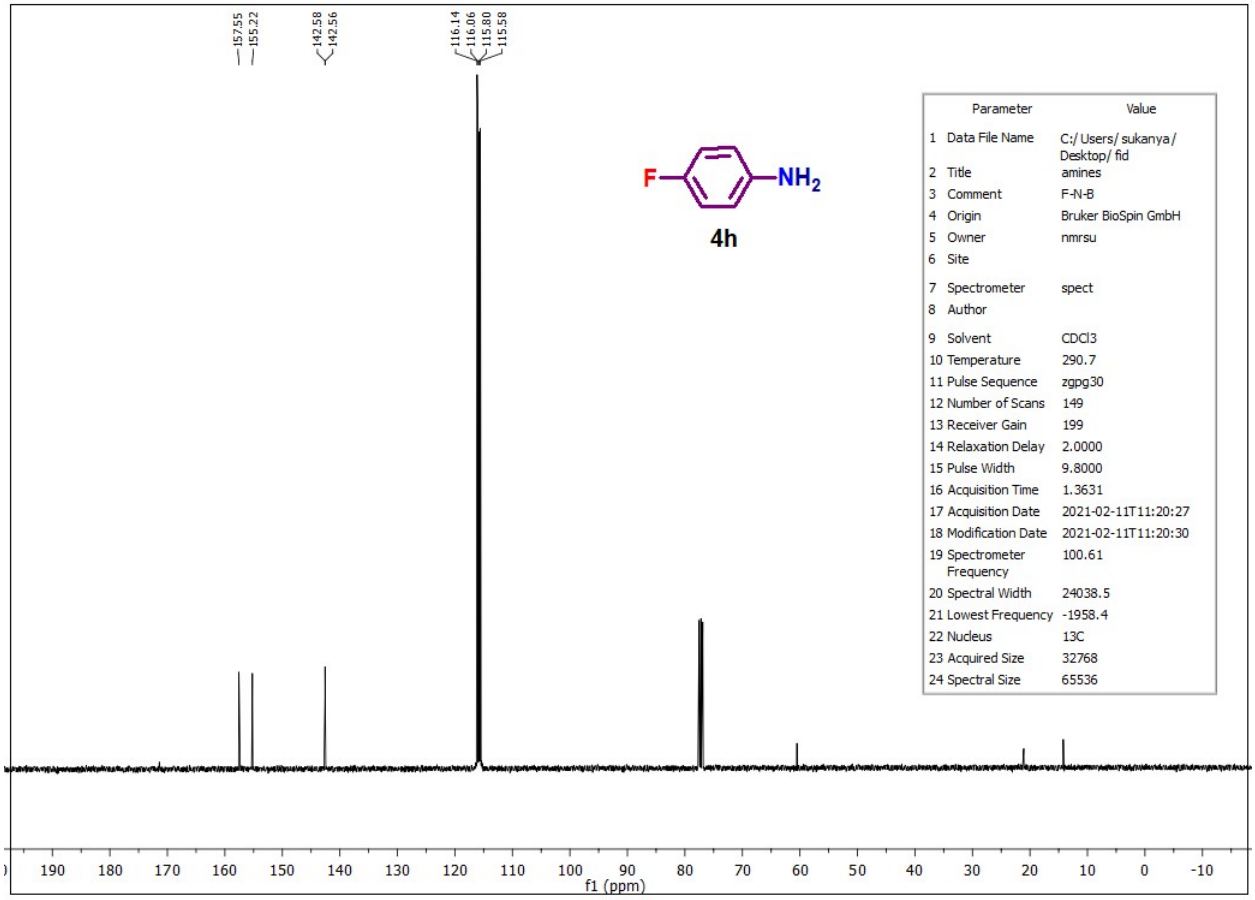


Figure 40. ^{13}C NMR spectra of 4-fluoroaniline.

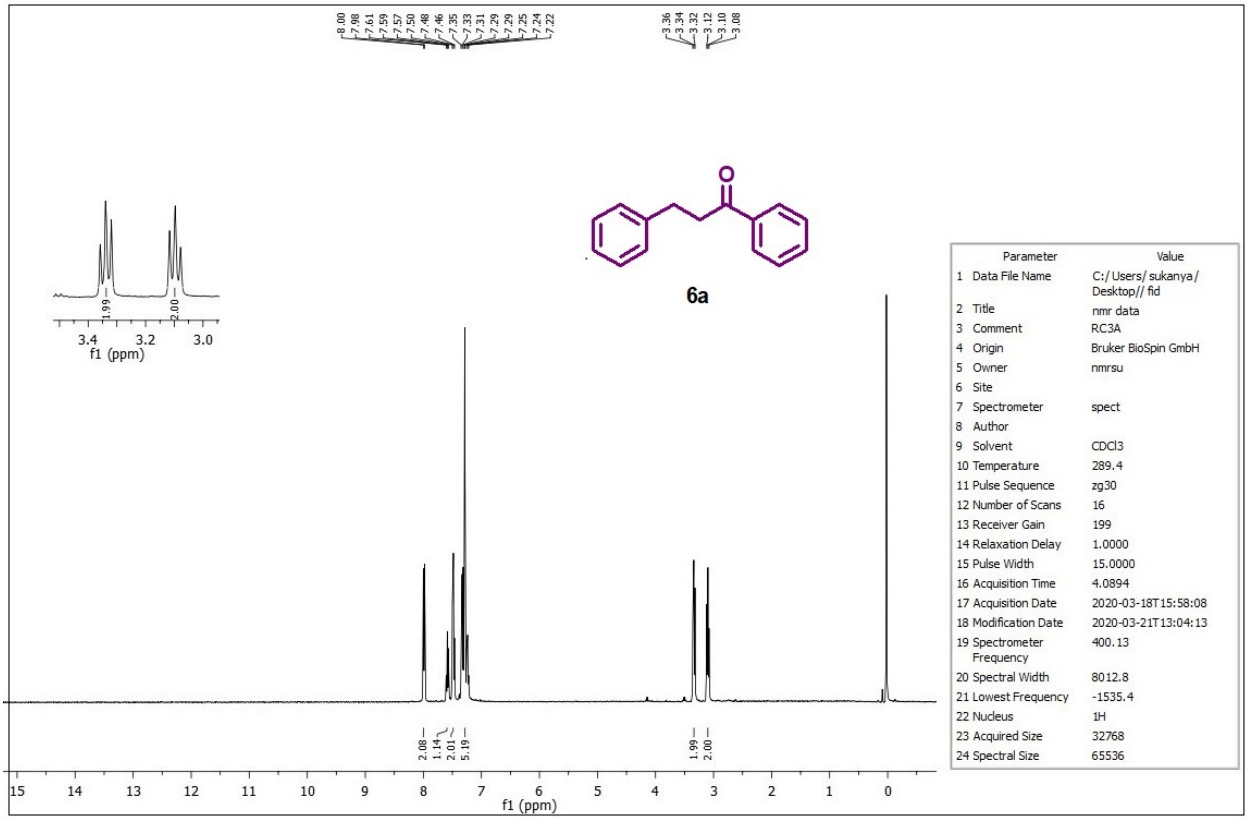


Figure 41. ^{1}H NMR spectra of 1,3-diphenylpropan-1-one.

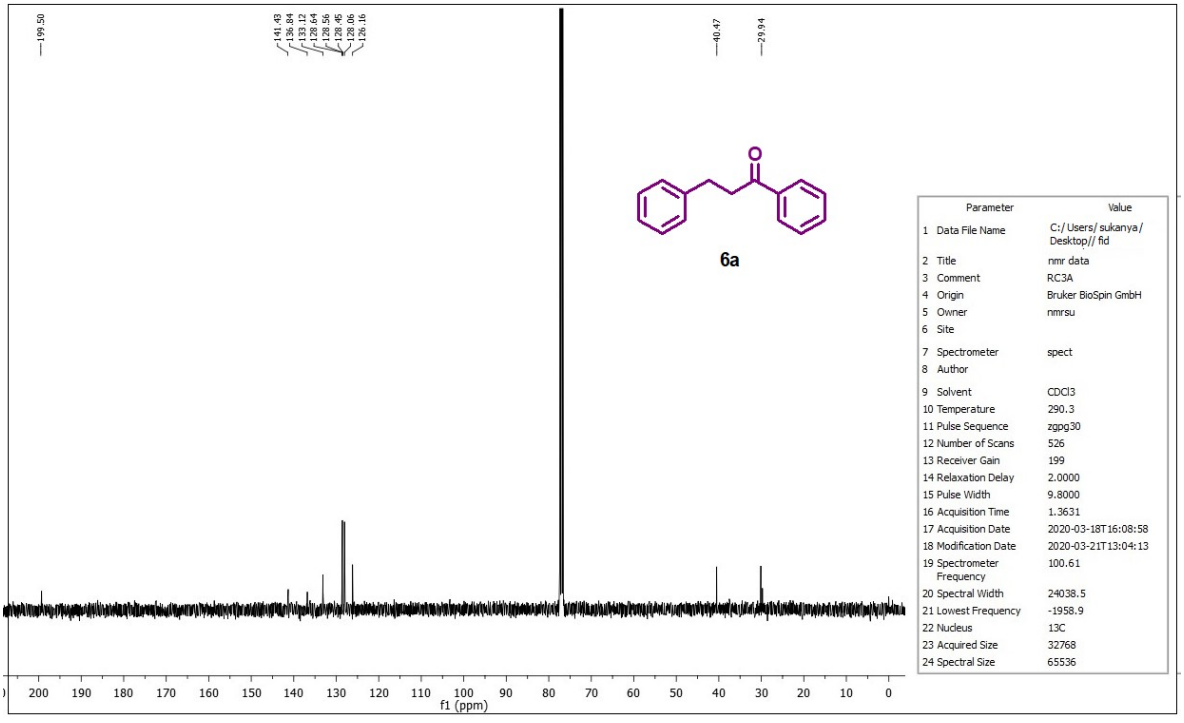


Figure 42. ^{13}C NMR spectra of 1,3-diphenylpropan-1-one.

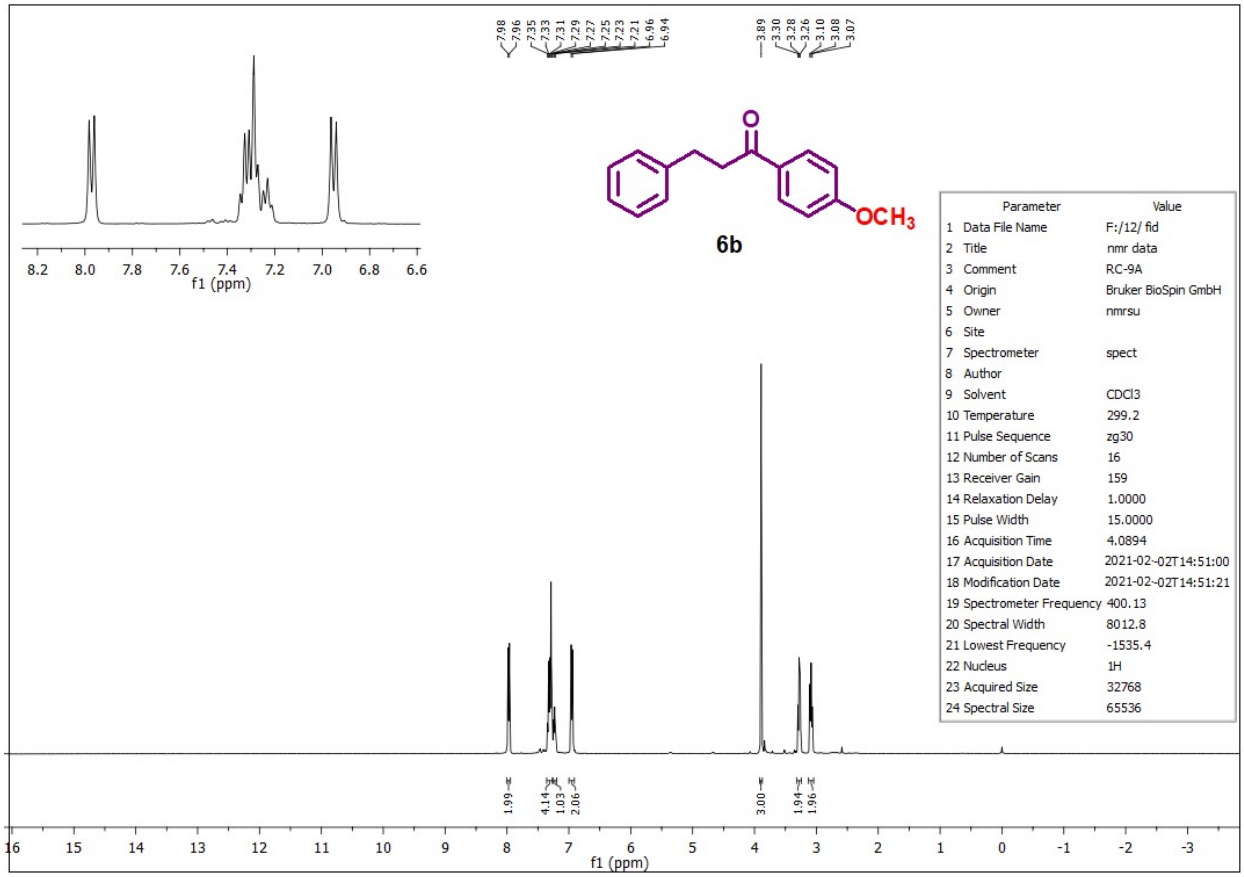


Figure 43. ^{1}H NMR spectra of 1-(4-methoxyphenyl)-3-phenylpropan-1-one.

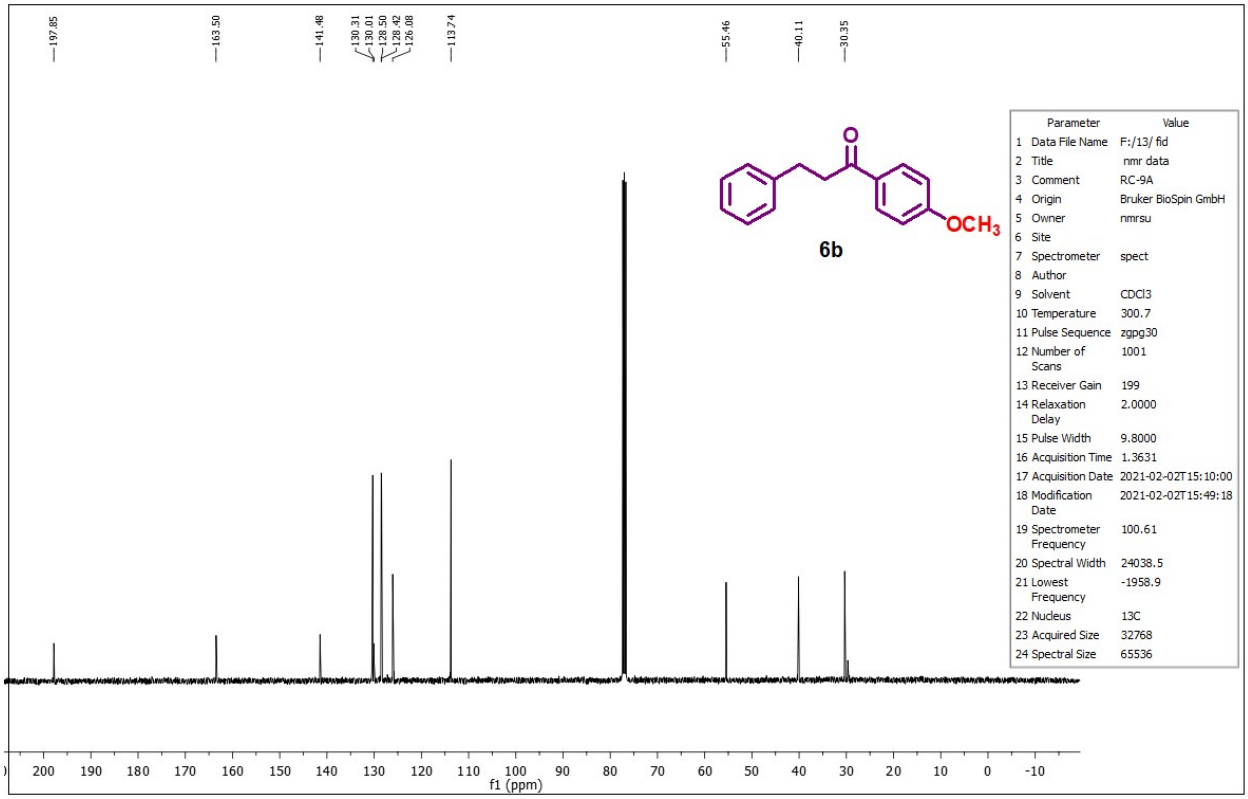


Figure 44. ^{13}C NMR spectra of 1-(4-methoxyphenyl)-3-phenylpropan-1-one.

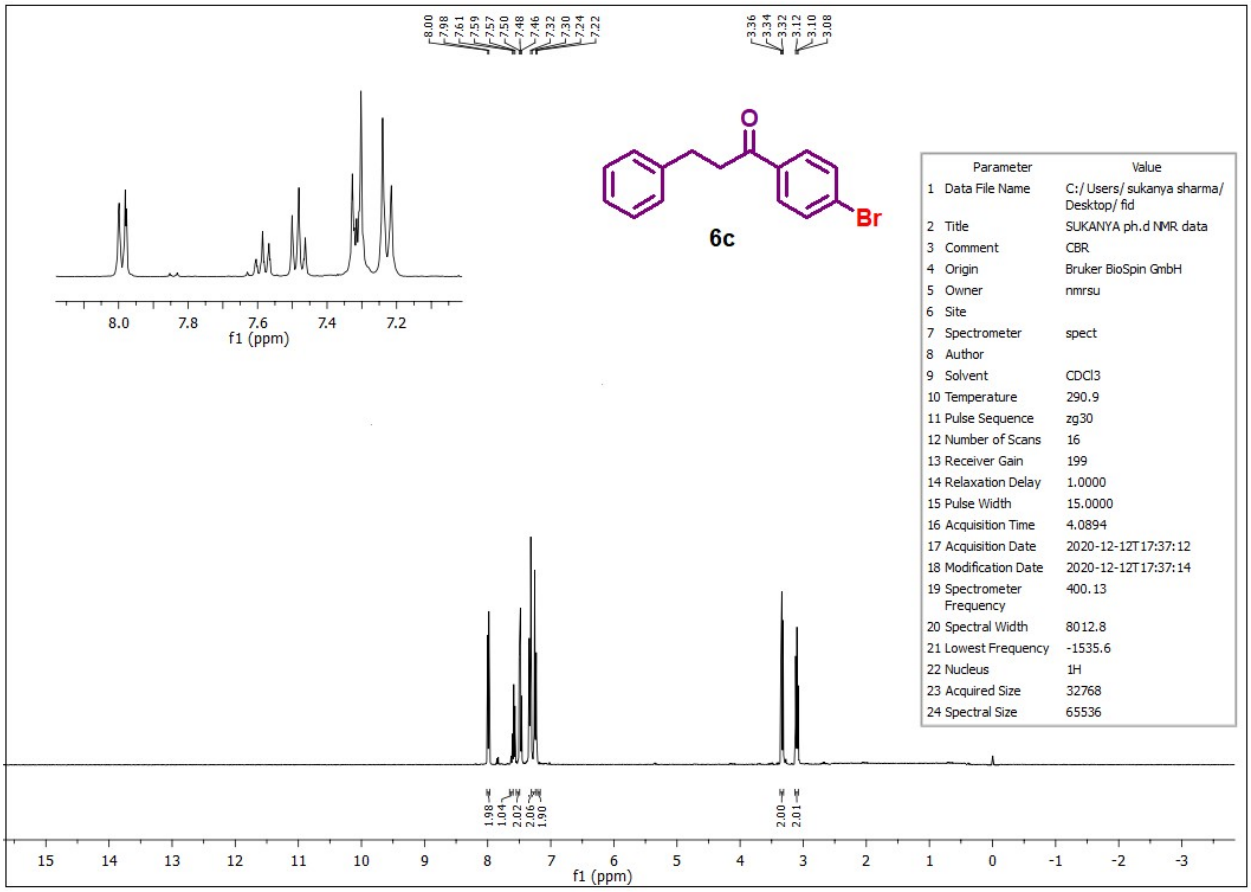


Figure 45. ^{1}H NMR spectra of 1-(4-bromophenyl)-3-phenylpropan-1-one.

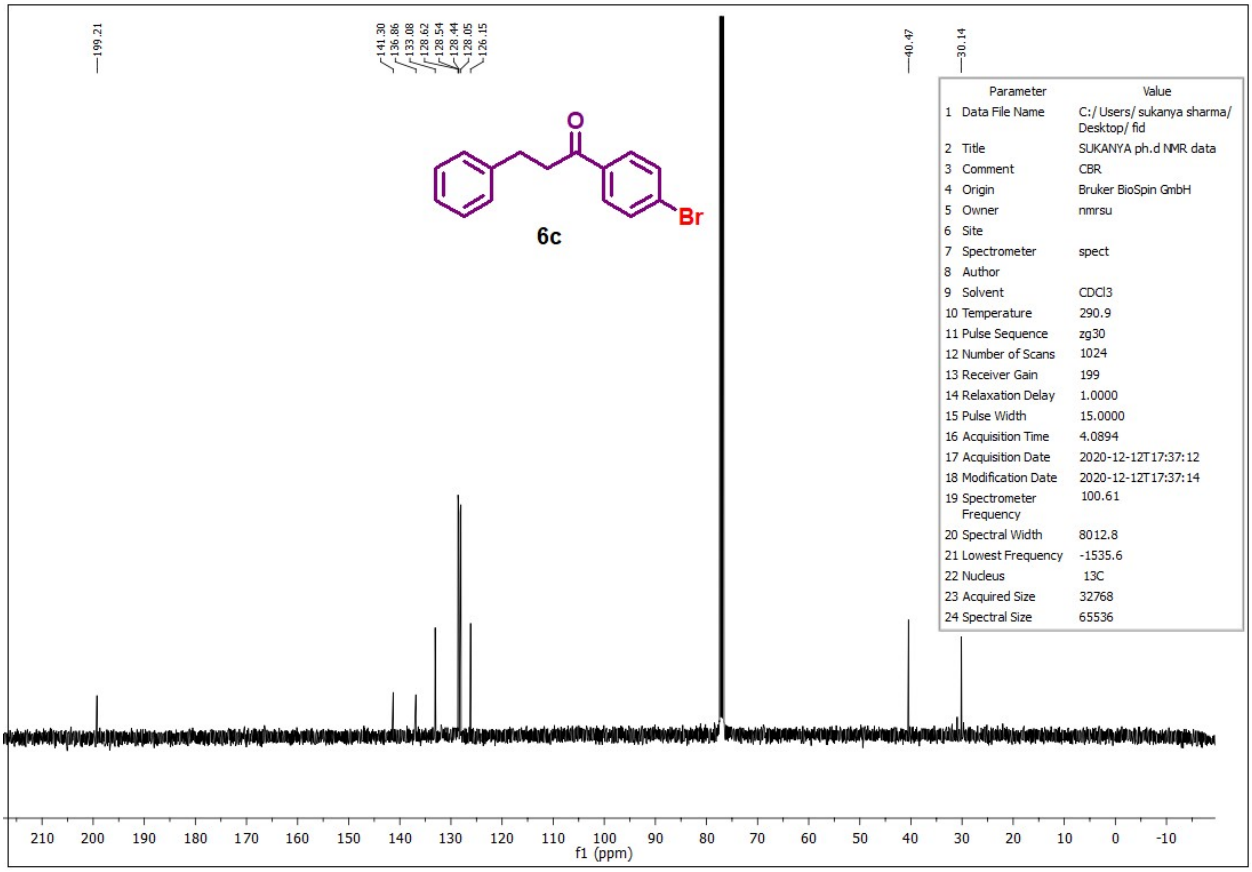


Figure 46. ^{13}C NMR spectra of 1-(4-bromophenyl)-3-phenylpropan-1-one.

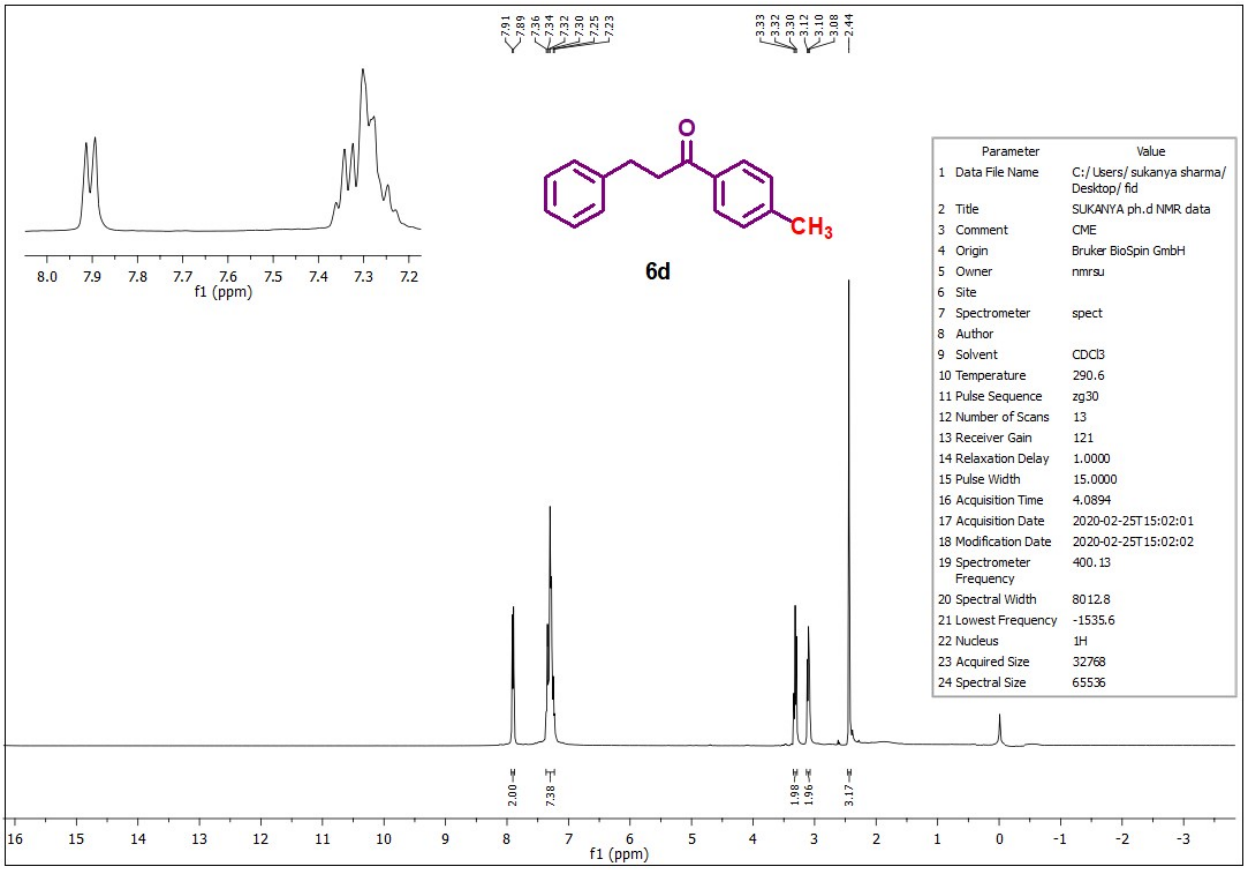


Figure 47. ^{1}H NMR spectra of 1-(4-methylphenyl)-3-phenylpropan-1-one

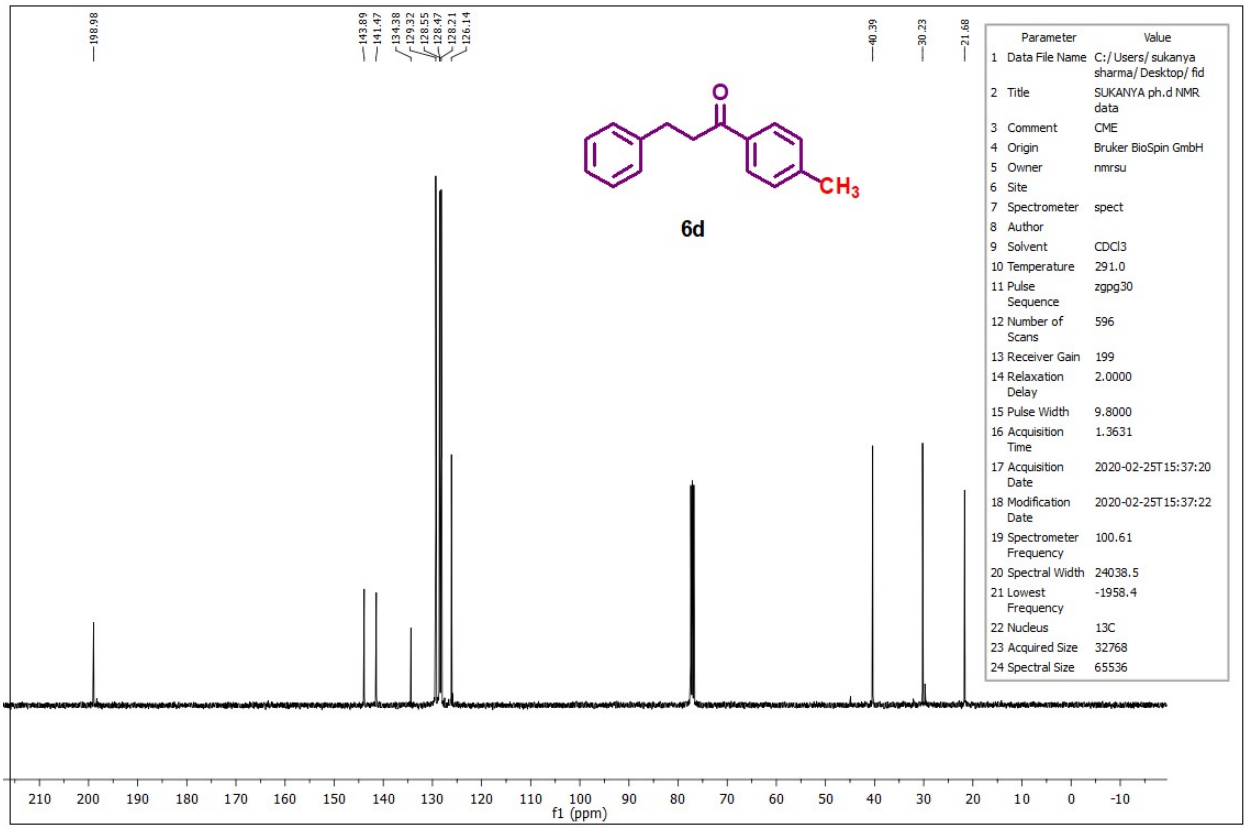


Figure 48. ^{13}C NMR spectra of 1-(4-methylphenyl)-3-phenylpropan-1-one.

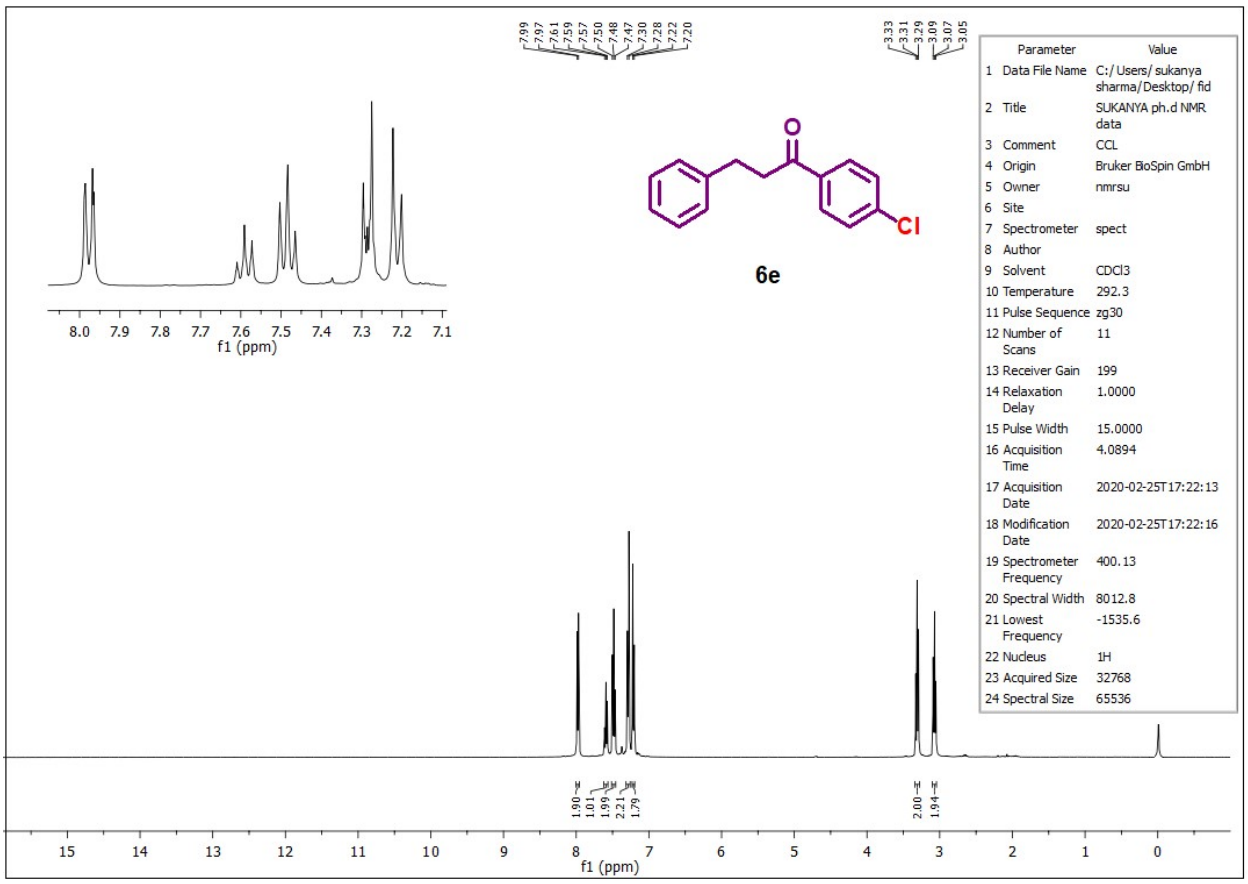


Figure 49. ^{1}H NMR spectra of 1-(4-chlorophenyl)-3-phenylpropan-1-one.

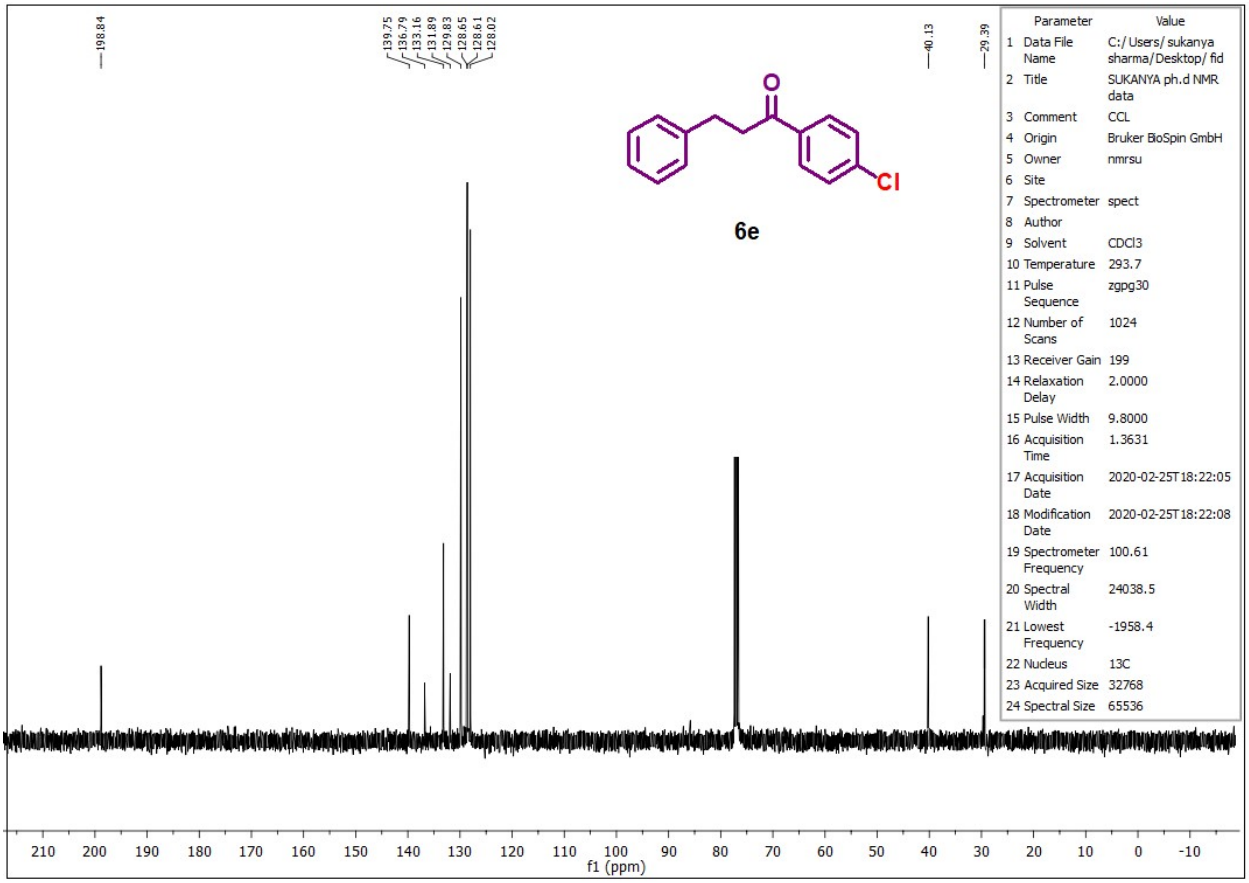


Figure 50. ^{13}C NMR spectra of 1-(4-chlorophenyl)-3-phenylpropan-1-one.

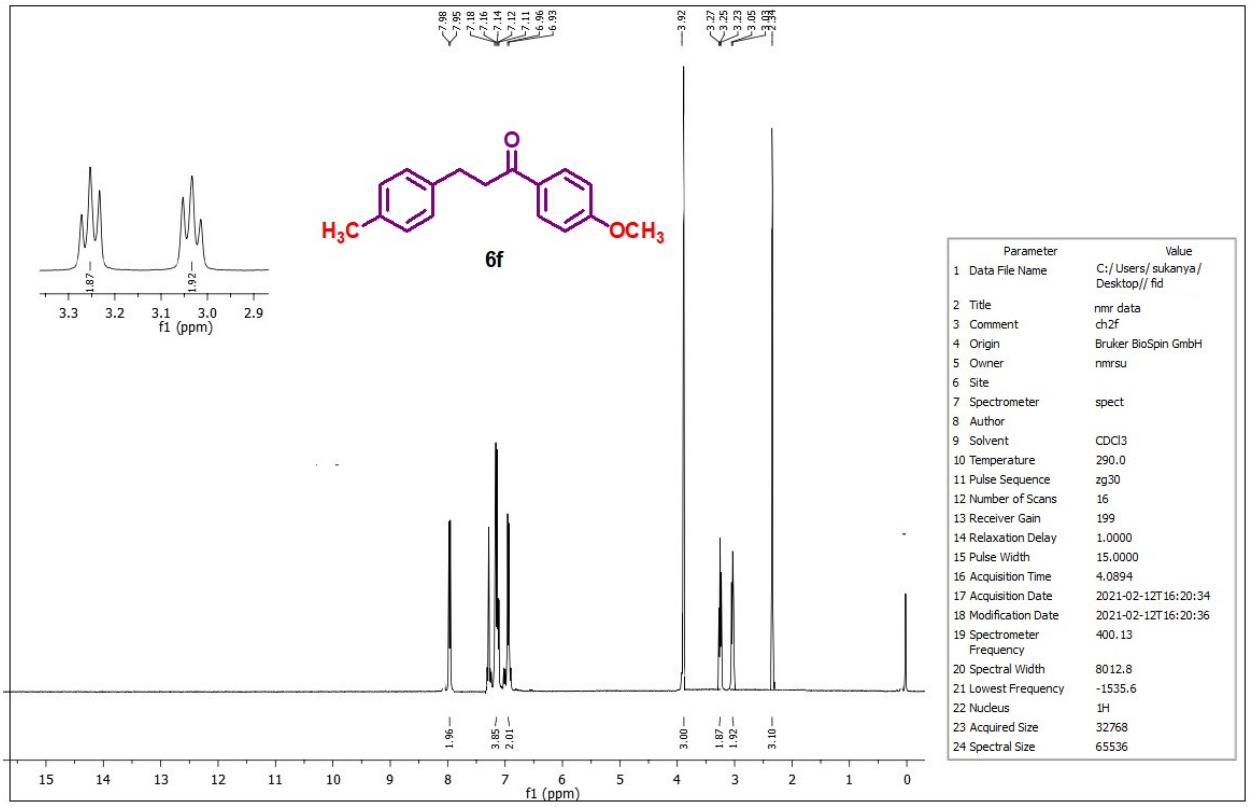


Figure 51. [1]H NMR spectra of 3-(4-methylphenyl)-1-(4'-methoxyphenyl)propan-1-one.

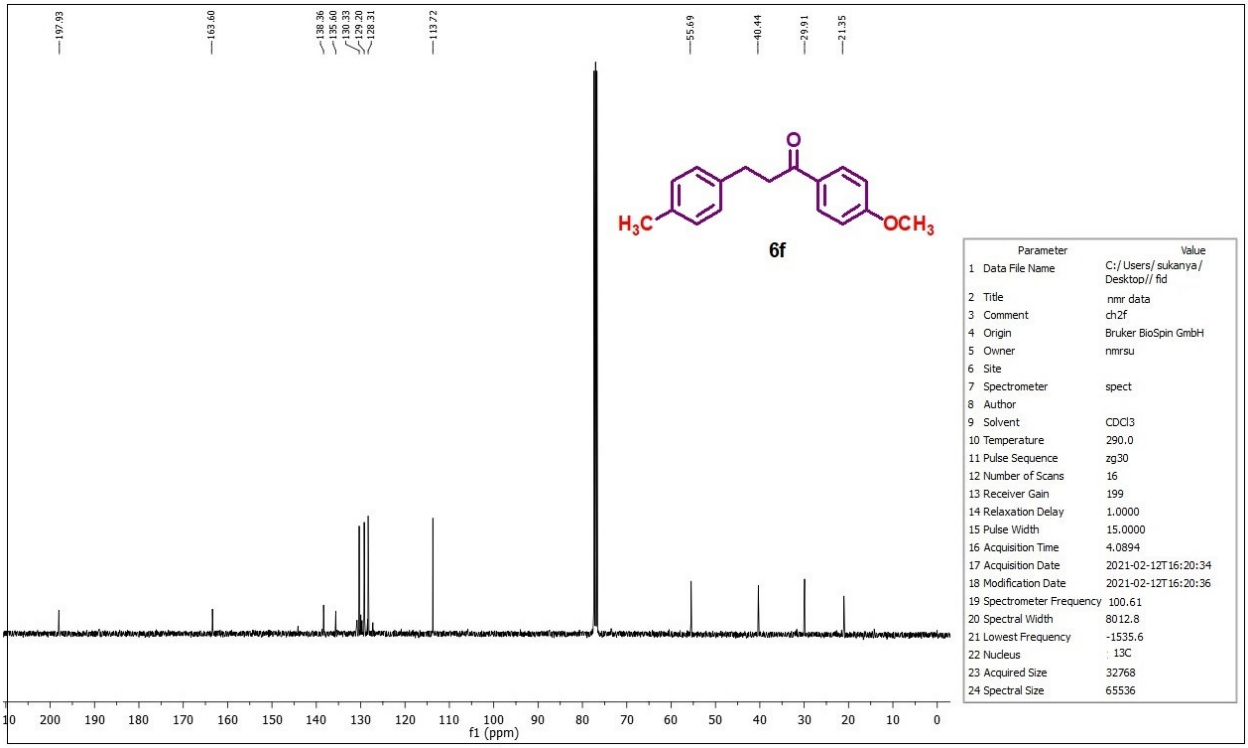


Figure 52. [13]C NMR spectra of 3-(4-methylphenyl)-1-(4'-methoxyphenyl)propan-1-one.

S6. 1H NMR and 13C NMR spectra of compounds listed in Table 6

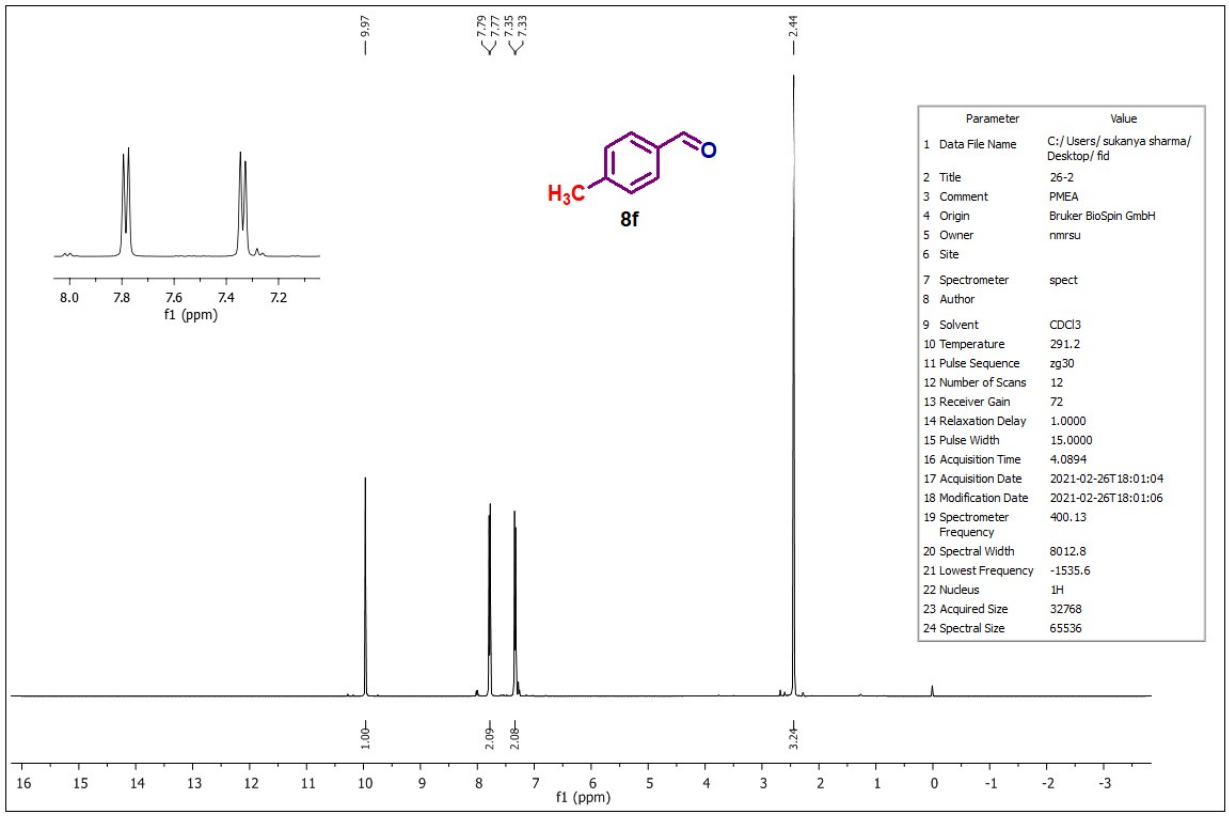


Figure 53. [1]H NMR spectra of 4-Methylbenzaldehyde.

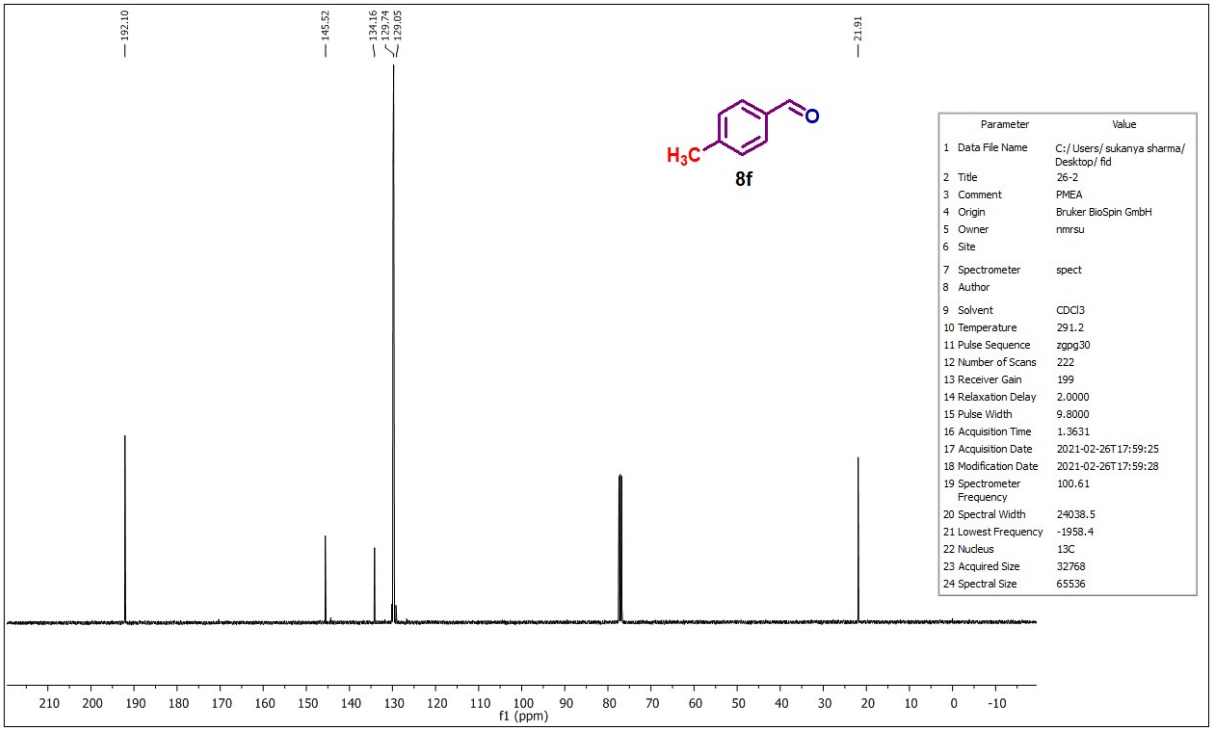


Figure 54. ^{13}C NMR spectra of 4-Methylbenzaldehyde.

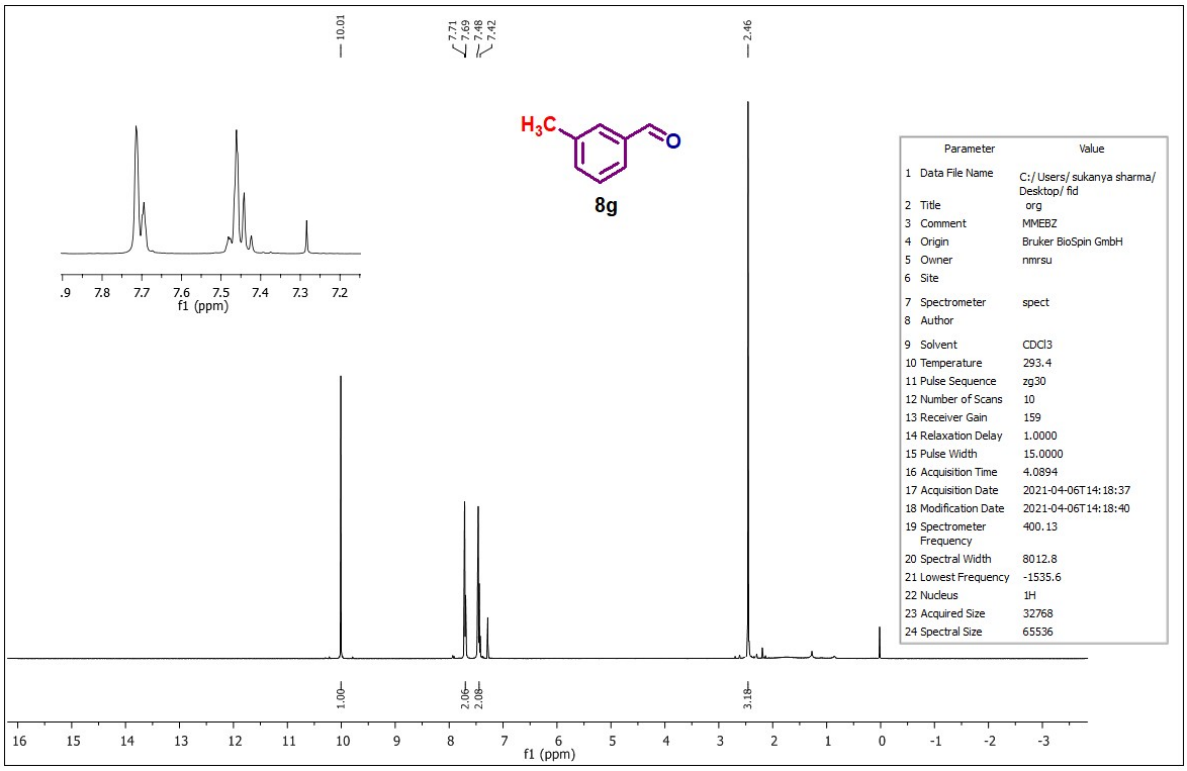


Figure 55. [1]H NMR spectra of 3-Methylbenzaldehyde.

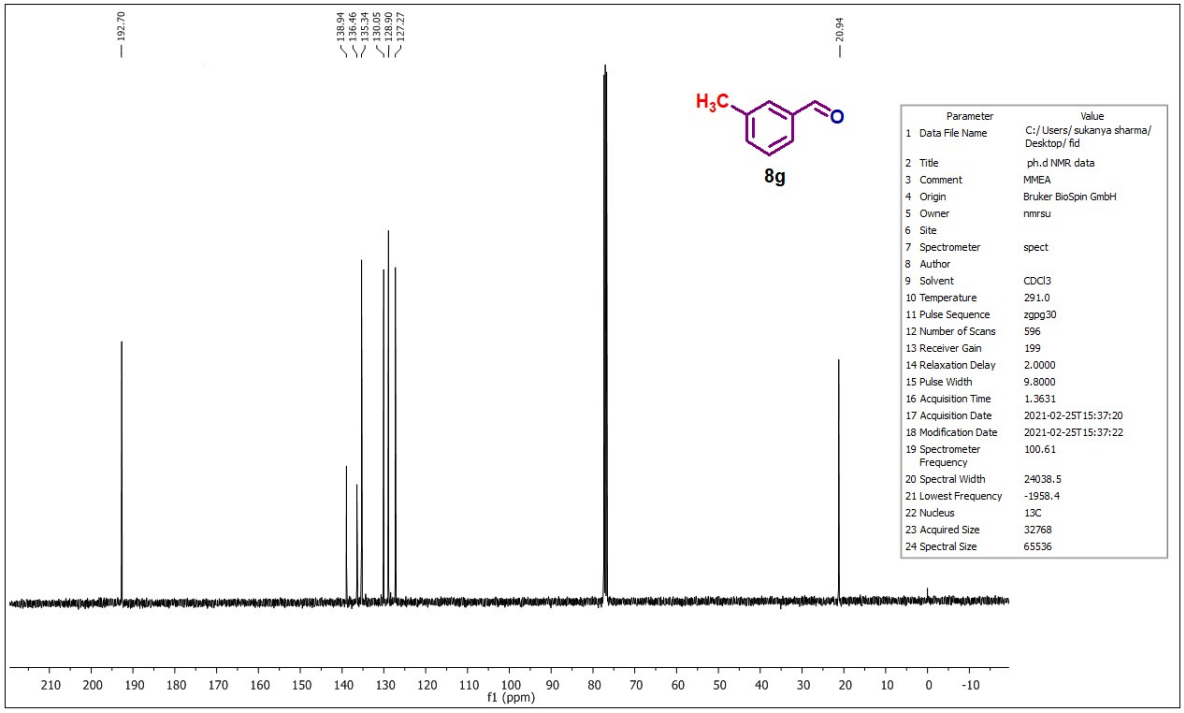


Figure 56. [13]C NMR spectra of 3-Methylbenzaldehyde.